

High-Speed Counter Module

User's Manual

**mitsubishi**

**Q series**  
**Q series**

Mitsubishi  
Programmable Controller

**MELSEC-Q**

***QD62***

***QD62E***

***QD62D***

***GX Configurator-CT***  
***(SW0D5C-QCTU-E)***



## • SAFETY PRECAUTIONS •

(Always read before starting use.)

Before using this product, please read this manual introduced in this manual carefully and pay full attention to safety to handle the product correctly.

The instructions given in this manual are concerned with this product. For the safety instructions of the programmable controller system, please read the User's Manual for the CPU module to use.

In this manual, the safety instructions are ranked as "DANGER" and "CAUTION".



**DANGER**

Indicates that incorrect handling may cause hazardous conditions, resulting in death or severe injury.



**CAUTION**

Indicates that incorrect handling may cause hazardous conditions, resulting in medium or slight personal injury or physical damage.

Note that the  CAUTION level may lead to a serious consequence according to the circumstances. Always follow the instructions of both levels because they are important to personal safety.

Please store this manual in a safe place and make it accessible when required. Always forward it to the end user.

### [DESIGN PRECAUTIONS]



**DANGER**

- Do not write data into the "system area" of the buffer memory of intelligent function modules. Writing data into the "system area" may cause a programmable controller system malfunction.
- Depending on the malfunction of the external output transistor, there may be cases where the output is ON or OFF status. Install external monitoring circuitry for output signals that may lead to major accidents.



**CAUTION**

- Do not bunch the control wires or communication cables with the main circuit or power wires, or install them close to each other.  
They should be installed 150 mm (5.9 inch) or more from each other.  
Not doing so could result in noise that may cause malfunction.

## [INSTALLATION PRECAUTIONS]

### CAUTION

- Use the programmable controller in an environment that meets the general specifications contained in the CPU User's Manual.  
Using this programmable controller in an environment outside the range of the general specifications may cause electric shock, fire, malfunction, and damage to or deterioration of the product.
- While pressing the installation lever located at the bottom of module, insert the module fixing tab into the fixing hole in the base unit until it stops. Then, securely mount the module with the fixing hole as a supporting point.  
Improper installation may result in malfunction, breakdown or the module coming loose and dropping. Securely fix the module with screws if it is subject to vibration during use.
- Tighten the screws within the range of specified torque.  
If the screws are loose, it may cause the module to fallout, short circuits, or malfunction.  
If the screws are tightened too much, it may cause damage to the screw and/or the module, resulting in fallout, short circuits or malfunction.
- Be sure to shut off all phases of the external power supply used by the system before mounting or removing the module.  
Not doing so may cause electric shock or damage to the module.
- Do not directly touch the conductive area or electronic components of the module.  
Doing so may cause malfunction or failure in the module.

## [WIRING PRECAUTIONS]

### CAUTION

- Perform correct pressure-displacement, crimp-contact or soldering for connector wire connections using the tools specified by the manufactures.  
Attach connectors to the module securely.
- Be careful not to let foreign matters such as sawdust or wire chips get inside the module.  
They may cause fires, failure or malfunction.
- The top surface of the module is covered with protective film to prevent foreign objects such as cable offcuts from entering the module when wiring.  
Do not remove this film until the wiring is complete.  
Before operating the system, be sure to remove the film to provide adequate heat ventilation.
- Be sure to fix communication cables or power supply cables leading from the module by placing them in the duct or clamping them.  
Cables not placed in the duct or without clamping may hang or shift, allowing them to be accidentally pulled, which may cause a module malfunction and cable damage.

## [WIRING PRECAUTIONS]

### CAUTION

- When removing the communication cable from the module, do not pull the cable. When removing the cable with a connector, hold the connector on the side that is connected to the modules.  
Pulling the cable that is still connected to the module may cause malfunction or damage to the module or cable.
- Always ground the shielded cable on the encoder side (relay box).  
Otherwise, malfunction may occur.
- When wiring, be sure to verify the rated voltage of the product as well as the terminal layout. Fire or failure may result if incorrect voltage is input or incorrect wiring is performed.
- Connecting terminals with incorrect voltage may result in malfunction or mechanical failure.

## [STARTUP/MAINTENANCE PRECAUTIONS]

### CAUTION

- Do not disassemble or modify the module.  
Doing so could cause failure, malfunction, injury or fire.
- Be sure to shut off all phases of the external power supply used by the system before mounting or removing the module.  
Not doing so may cause failure or malfunction of the module.
- Do not mount/remove the module onto/from the base unit more than 50 times (IEC61131-2-compliant), after the first use of the product. Failure to do so may cause the module to malfunction.
- Do not touch the connector while the power is on.  
Doing so may cause malfunction.
- Be sure to shut off all phases of the external power supply before cleaning or retightening the terminal screws or module fixing screws.  
Not doing so may cause failure or malfunction of the module.  
If the screws are loose, it may cause the module to fallout, short circuits, or malfunction.  
If the screws are tightened too much, it may cause damages to the screws and/or the module, resulting in the module falling out, short circuits or malfunction.
- Always make sure to touch the grounded metal to discharge the electricity charged in the body, etc., before touching the module.  
Failure to do so may cause a failure or malfunctions of the module.

## [DISPOSAL PRECAUTIONS]

### CAUTION

- When disposing of the product, handle it as industrial waste.

## REVISIONS

\* The manual number is given on the bottom left of the back cover.

| Print Date | * Manual Number | Revision                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|------------|-----------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Dec., 1999 | SH(NA)-080036-A | First edition                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Oct., 2000 | SH(NA)-080036-B | <div>Correction</div> <p>About the Generic Terms and Abbreviation, Section 2.1, Section 7.2.2, 7.3.3, 7.6.1</p>                                                                                                                                                                                                                                                                                                                                                                                    |
| Jun., 2001 | SH(NA)-080036-C | <p>Standardize the name from software package (GPP function) to Product name (GX Developer).<br/>Standardize the name from utility package (QCTU) to Product name (GX Configurator-CT).</p> <div>Addition</div> <p>Section 2.2, 2.3</p> <div>Correction</div> <p>SAFETY PRECAUTIONS, Conformation to the EMC Directive and Low Voltage Instruction, About the Generic Terms and Abbreviations, Product Structure, Section 2.1, Section 3.2, 3.5, Section 6.2, Section 7.2, 7.2.1, 7.2.2, 7.3.3</p> |
| Feb., 2002 | SH(NA)-080036-D | <div>Correction</div> <p>About the Generic Terms and Abbreviation, Section 2.1, Section 7.2.1, 7.2.2</p>                                                                                                                                                                                                                                                                                                                                                                                           |
| Feb., 2003 | SH(NA)-080036-E | <div>Correction</div> <p>SAFETY PRECAUTIONS, INTRODUCTION, CONTENTS, About the Generic Terms and Abbreviations, Section 2.1, Section 3.5, Section 4.3, Section 5.4, Section 7.2.2, Section 7.3.2, Section 7.3.3, Section 7.4 to Section 7.6, Section 8.1.1, INDEX</p>                                                                                                                                                                                                                              |
| May, 2003  | SH(NA)-080036-F | <div>Correction</div> <p>Section 2.3, Section 5.3</p>                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Jun., 2004 | SH(NA)-080036-G | <div>Addition</div> <p>Section 2.4</p> <div>Correction</div> <p>SAFETY PRECAUTIONS, Section 4.1, Section 5.1.3, Section 7.4, Section 7.6.1, Section 8.1, Section 8.2</p>                                                                                                                                                                                                                                                                                                                           |
| Oct., 2004 | SH(NA)-080036-H | <div>Correction</div> <p>SAFETY PRECAUTIONS, Section 2.1, Section 4.1</p>                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Jul., 2005 | SH(NA)-080036-I | <div>Correction</div> <p>Section 6.5, Section 8.2</p>                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Feb., 2006 | SH(NA)-080036-J | <div>Correction</div> <p>Conformation to the EMC Directive and Low Voltage Instruction, Section 2.2, Section 7.2.2</p>                                                                                                                                                                                                                                                                                                                                                                             |

\* The manual number is given on the bottom left of the back cover.

| Print Date | * Manual Number | Revision                                                                                                                                                                                                                                                                                                                       |
|------------|-----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Jun., 2007 | SH(NA)-080036-K | <div>Correction</div> <p>CONTENTS, About the Generic Terms and Abbreviations, Section 3.1, Section 3.3.2, Section 4.1, Section 4.3 to 4.5, Section 5.1.1, Section 5.2, Section 5.3, Section 6.4, Section 6.5, Section 7.3.1 to 7.3.3, Section 7.4 to 7.6, Chapter 8, Section 8.1.1, Section 8.3, Section 9.1 to 9.3, INDEX</p> |
| Jan., 2008 | SH(NA)-080036-L | <div>Correction</div> <p>CONTENTS, About the Generic Terms and Abbreviations, Section 2.2, Section 2.5, Section 7.2.2, Section 7.3.2, Section 7.3.3, Section 7.4, Section 7.6</p> <div>Addition</div> <p>Section 2.3</p>                                                                                                       |
|            |                 |                                                                                                                                                                                                                                                                                                                                |

Japanese Manual Version SH-080035-O

This manual confers no industrial property rights or any rights of any other kind, nor does it confer any patent licenses. Mitsubishi Electric Corporation cannot be held responsible for any problems involving industrial property rights which may occur as a result of using the contents noted in this manual.

© 1999 MITSUBISHI ELECTRIC CORPORATION

## INTRODUCTION

Thank you for purchasing the MELSEC-Q series programmable controller.

Before using the equipment, please read this manual carefully to develop full familiarity with the functions and performance of the Q series programmable controller you have purchased, so as to ensure correct use.

## CONTENTS

|                                                                     |      |
|---------------------------------------------------------------------|------|
| SAFETY PRECAUTIONS .....                                            | A- 1 |
| REVISIONS .....                                                     | A- 4 |
| INTRODUCTION .....                                                  | A- 6 |
| CONTENTS .....                                                      | A- 6 |
| Conformation to the EMC Directive and Low Voltage Instruction ..... | A- 9 |
| About the Generic Terms and Abbreviations .....                     | A- 9 |
| Product Structure .....                                             | A- 9 |

|                   |                     |
|-------------------|---------------------|
| <b>1 OVERVIEW</b> | <b>1- 1 to 1- 3</b> |
|-------------------|---------------------|

|                    |      |
|--------------------|------|
| 1.1 Features ..... | 1- 2 |
|--------------------|------|

|                               |                     |
|-------------------------------|---------------------|
| <b>2 SYSTEM CONFIGURATION</b> | <b>2- 1 to 2- 5</b> |
|-------------------------------|---------------------|

|                                                                             |      |
|-----------------------------------------------------------------------------|------|
| 2.1 Applicable Systems .....                                                | 2- 1 |
| 2.2 About Use of the QD62 (E/D) with the Q00J/Q00/Q01CPU .....              | 2- 3 |
| 2.3 About Use of the QD62 (E/D) with the Q12PRH/Q25PRHCPU .....             | 2- 4 |
| 2.4 About Use of the QD62 (E/D) on the MELSECNET/H Remote I/O Station ..... | 2- 4 |
| 2.5 How to Check Software Version .....                                     | 2- 5 |

|                         |                     |
|-------------------------|---------------------|
| <b>3 SPECIFICATIONS</b> | <b>3- 1 to 3-14</b> |
|-------------------------|---------------------|

|                                                           |      |
|-----------------------------------------------------------|------|
| 3.1 Performance Specifications .....                      | 3- 1 |
| 3.2 Function List .....                                   | 3- 4 |
| 3.3 I/O Signals for the programmable controller CPU ..... | 3- 5 |
| 3.3.1 List of I/O signals .....                           | 3- 5 |
| 3.3.2 Functions of I/O signals .....                      | 3- 6 |
| 3.4 Buffer Memory Assignments .....                       | 3- 8 |
| 3.5 Interface with External Devices .....                 | 3-11 |
| 3.6 Encoders that can be Connected .....                  | 3-14 |

|                                                            |                     |
|------------------------------------------------------------|---------------------|
| <b>4 SETUP AND PROCEDURE BEFORE STARTING THE OPERATION</b> | <b>4- 1 to 4-16</b> |
|------------------------------------------------------------|---------------------|

|                                                                           |      |
|---------------------------------------------------------------------------|------|
| 4.1 Handling Precautions .....                                            | 4- 1 |
| 4.2 Procedure Before Starting the Operation .....                         | 4- 2 |
| 4.3 Part Identification Nomenclature .....                                | 4- 3 |
| 4.4 Wiring .....                                                          | 4- 5 |
| 4.4.1 Wiring precautions .....                                            | 4- 5 |
| 4.4.2 Wiring example of a module and an encoder .....                     | 4- 6 |
| 4.4.3 Wiring example of a controller and an external input terminal ..... | 4- 8 |
| 4.4.4 Wiring example with an external output .....                        | 4-11 |
| 4.4.5 Using the connector/terminal block converter module .....           | 4-12 |
| 4.5 Switch Settings for the Intelligent Function Module .....             | 4-14 |

|                                                                                   |                     |
|-----------------------------------------------------------------------------------|---------------------|
| <b>5 BASIC USAGE</b>                                                              | <b>5- 1 to 5-11</b> |
| 5.1 Pulse Input and Counting Method .....                                         | 5- 1                |
| 5.1.1 Types of pulse input methods .....                                          | 5- 1                |
| 5.1.2 Setting the count method .....                                              | 5- 3                |
| 5.1.3 Reading the present values .....                                            | 5- 3                |
| 5.2 Selecting the Counter Format .....                                            | 5- 4                |
| 5.2.1 Selecting the linear counter .....                                          | 5- 4                |
| 5.2.2 Selecting the ring counter .....                                            | 5- 5                |
| 5.3 Using the Coincidence Output Function .....                                   | 5- 7                |
| 5.4 Using the Preset Function .....                                               | 5-10                |
| <b>6 CONVENIENT USAGE</b>                                                         | <b>6- 1 to 6- 8</b> |
| 6.1 Selecting the Counter Function .....                                          | 6- 1                |
| 6.1.1 Reading the counter function selection count value .....                    | 6- 2                |
| 6.1.2 Count error .....                                                           | 6- 3                |
| 6.2 Using the Disable Count Function .....                                        | 6- 4                |
| 6.3 Using the Latch Counter Function .....                                        | 6- 5                |
| 6.4 Using the Sampling Counter Function .....                                     | 6- 6                |
| 6.5 Using the Periodic Pulse Counter Function .....                               | 6- 7                |
| <b>7 UTILITY PACKAGE (GX Configurator-CT)</b>                                     | <b>7- 1 to 7-19</b> |
| 7.1 Functions of the Utility Package .....                                        | 7- 1                |
| 7.2 Installing and Uninstalling the Utility Package .....                         | 7- 2                |
| 7.2.1 Handling precautions .....                                                  | 7- 2                |
| 7.2.2 Operating environment .....                                                 | 7- 4                |
| 7.3 Explanation of Utility Package Operations .....                               | 7- 6                |
| 7.3.1 How to perform common utility package operations .....                      | 7- 6                |
| 7.3.2 Operation overview .....                                                    | 7- 8                |
| 7.3.3 Starting the Intelligent function module utility .....                      | 7- 10               |
| 7.4 Initial Settings .....                                                        | 7-12                |
| 7.5 Auto Refresh .....                                                            | 7-14                |
| 7.6 Monitoring/Test .....                                                         | 7-16                |
| 7.6.1 Monitoring/Test .....                                                       | 7-16                |
| <b>8 PROGRAMMING</b>                                                              | <b>8- 1 to 8-10</b> |
| 8.1 Program Example When GX Configurator-CT is Used .....                         | 8- 2                |
| 8.1.1 Operating GX Configurator-CT .....                                          | 8- 2                |
| 8.1.2 Program example .....                                                       | 8- 4                |
| 8.2 Program Example when GX Configurator-CT is not Used .....                     | 8- 6                |
| 8.3 Example of a Program Using the Coincidence Detection Interrupt Function ..... | 8- 9                |

|                                                                     |                      |
|---------------------------------------------------------------------|----------------------|
| 9 TROUBLESHOOTING                                                   | 9- 1 to 9- 3         |
| 9.1 Error Information .....                                         | 9- 1                 |
| 9.2 When the QD62(E/D) Does Not Start Counting.....                 | 9- 2                 |
| 9.3 When the QD62(E/D) Does Not Normally Count.....                 | 9- 3                 |
| APPENDIX                                                            | App- 1 to App- 2     |
| Appendix 1 External Dimension Diagram .....                         | App- 1               |
| Appendix 2 Difference Between A1SD62, A1SD62E and A1SD62D(S1) ..... | App- 2               |
| INDEX                                                               | Index- 1 to Index- 2 |

### Conformation to the EMC Directive and Low Voltage Instruction

When incorporating the Mitsubishi programmable controller into other machinery or equipment and keeping compliance with the EMC and low voltage directives, refer to Chapter 3, "EMC and Low Voltage Directives" of the User's Manual (Hardware) included with the CPU module or base unit used.

The CE logo is printed on the rating plate on the main body of the programmable controller that conforms to the EMC directive and low voltage instruction.

By making this product conform to the EMC directive and low voltage instruction, it is not necessary to make those steps individually.

### About the Generic Terms and Abbreviations

This manual describes the Type QD62, QD62E and QD62D high-speed counter module using the following generic terms and abbreviations, unless otherwise specified.

| Generic Term/Abbreviation  | Description                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|----------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| QD62                       | Abbreviation of the Type QD62 high-speed counter module                                                                                                                                                                                                                                                                                                                                                                                                |
| QD62E                      | Abbreviation of the Type QD62E high-speed counter module                                                                                                                                                                                                                                                                                                                                                                                               |
| QD62D                      | Abbreviation of the Type QD62D high-speed counter module                                                                                                                                                                                                                                                                                                                                                                                               |
| QD62(E/D)                  | Generic term of QD62, QD62E and QD62D                                                                                                                                                                                                                                                                                                                                                                                                                  |
| DOS/V personal computer    | DOS/V-compatible personal computer of IBM PC/AT <sup>®</sup> and its compatible                                                                                                                                                                                                                                                                                                                                                                        |
| GX Developer               | Generic product name for SWnD5C-GPPW-E, SWnD5C-GPPW-EA, SWnD5C-GPPW-EV and SWnD5C-GPPW-EVA<br>("n" is 4 or greater.)<br>"-A" and "-V" denote volume license product and upgraded product respectively.                                                                                                                                                                                                                                                 |
| QCPU (Q mode)              | Generic term for the Q00JCPU, Q00CPU, Q01CPU, Q02CPU, Q02HCPU, Q06HCPU, Q12HCPU, Q25HCPU, Q12PHCPU, Q25PHCPU, Q02UCPU, Q03UDCPU, Q04UDHCPU, Q06UDHCPU, and Q06CCPU-V-H01                                                                                                                                                                                                                                                                               |
| GX Configurator-CT         | Abbreviation for GX Configurator-CT (SW0D5C-QCTU-E) of counter module setting/monitor tool                                                                                                                                                                                                                                                                                                                                                             |
| Windows Vista <sup>®</sup> | Generic term for the following:<br>Microsoft <sup>®</sup> Windows Vista <sup>®</sup> Home Basic Operating System,<br>Microsoft <sup>®</sup> Windows Vista <sup>®</sup> Home Premium Operating System,<br>Microsoft <sup>®</sup> Windows Vista <sup>®</sup> Business Operating System,<br>Microsoft <sup>®</sup> Windows Vista <sup>®</sup> Ultimate Operating System,<br>Microsoft <sup>®</sup> Windows Vista <sup>®</sup> Enterprise Operating System |
| Windows <sup>®</sup> XP    | Generic term for the following:<br>Microsoft <sup>®</sup> Windows <sup>®</sup> XP Professional Operating System,<br>Microsoft <sup>®</sup> Windows <sup>®</sup> XP Home Edition Operating System                                                                                                                                                                                                                                                       |

### Product Structure

The following are included in the package.

| Model Name     | Product Name                                                     | Quantity |
|----------------|------------------------------------------------------------------|----------|
| QD62           | Type QD62 high-speed counter module                              | 1        |
| QD62E          | Type QD62E high-speed counter module                             | 1        |
| QD62D          | Type QD62D high-speed counter module                             | 1        |
| SW0D5C-QCTU-E  | GX Configurator-CT Version 1 (1-license product) (CD-ROM)        | 1        |
| SW0D5C-QCTU-EA | GX Configurator-CT Version 1 (Multiple-license product) (CD-ROM) | 1        |

## 1 OVERVIEW

1

This User's Manual describes the specifications, handling and programming method for the QD62, QD62E and QD62D high-speed counter modules (QD62 (E/D)) used together with the MELSEC-Q series CPUs.

The QD62(E/D) modules are available with the following I/O types, maximum counting speeds and number of channels.

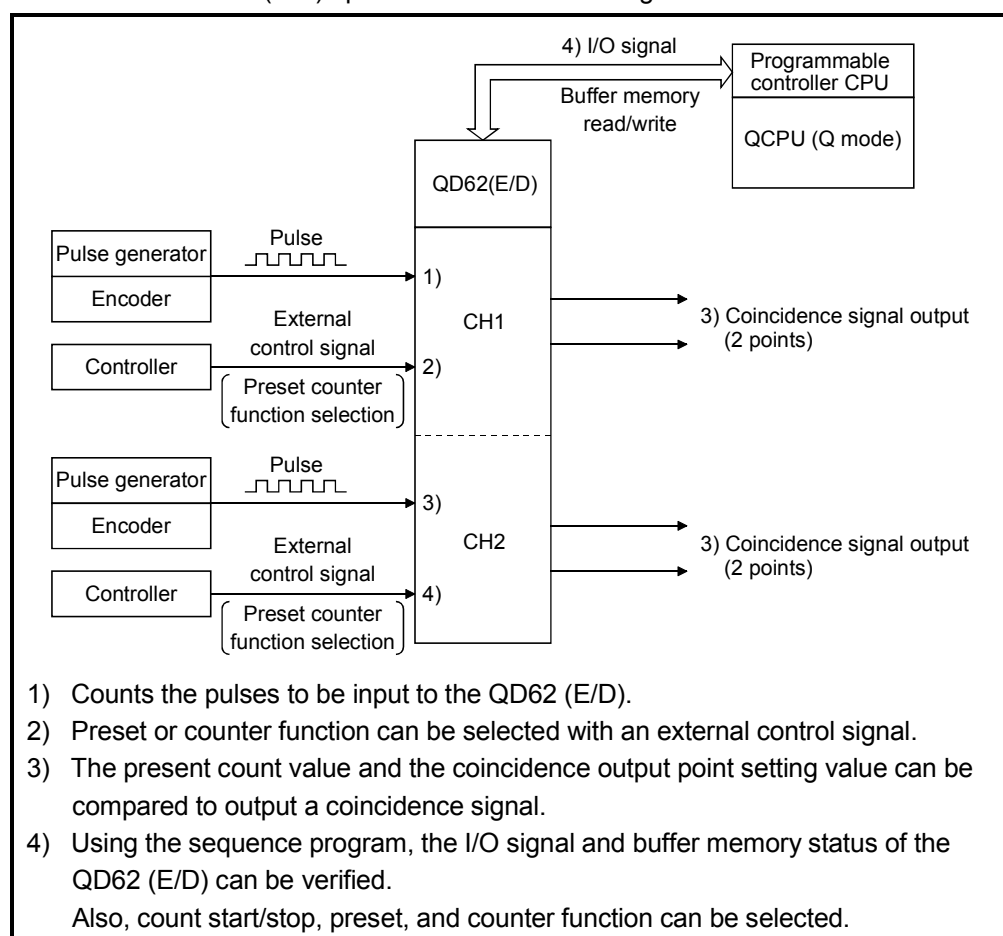
| Item                   | QD62                    | QD62E                    | QD62D                             |
|------------------------|-------------------------|--------------------------|-----------------------------------|
| I/O type               | DC input sinking output | DC input sourcing output | Differential input sinking output |
| Maximum counting speed | 200 kPPS                |                          | 500 kPPS                          |
| Number of channels     | 2 channels              |                          |                                   |

The QD62(E/D) modules have the following input methods for 1 phase/2 phase pulse input:

- Phase 1 pulse input multiple of 1    • Phase 1 pulse input multiple of 2    • CW/CCW
- Phase 2 pulse input multiple of 1    • Phase 2 pulse input multiple of 2
- Phase 2 pulse input multiple of 4

See Section 5.1 for details on the input methods.

An overview of QD62 (E/D) operation is shown in the figure below.



## 1.1 Features

The features of the QD62(ED) are as follows:

- (1) Counting can be performed in a wide range (The count value can be expressed within the range between –2147483648 and 2147483647)  
The count values are stored as 2-channel 32-bit signed binary codes.
- (2) The maximum counting speed can be changed  
The maximum speed of the QD62D can be changed by selecting from among 500 k, 200 k, 100 k and 10 k, while that of the QD62 and QD62E can be selected from among 200k, 100k and 10k. This allows an error-free count even with gradual rise/fall pulses.
- (3) Pulse input can be selected  
The pulse input can be selected from 1 phase multiple of 1, 1 phase multiple of 2, 2 phase multiple of 1, 2 phase multiple of 2, 2 phase multiple of 4, CW and CCW.
- (4) Counter format can be selected  
Either one of the following counter formats can be selected.
  - (a) Linear counter format  
A count from –2147483648 to 2147483647 is possible and if the count exceeds the range, an overflow will be detected.
  - (b) Ring counter format  
Counting is performed repeatedly between the ring counter maximum value and minimum value.
- (5) Coincidence output is possible  
Any channel coincidence output point can be preset to compare with the present counter value to output the ON/OFF signal output, or to start an interrupt program.
- (6) Selection can be made from four counter functions  
One of the following four functions can be selected.
  - (a) Latch counter function  
This function latches the present value of the counter when the signal was input.
  - (b) Sampling counter function  
This function counts the pulses that were input within the preset time period from the signal input.
  - (c) Periodic pulse counter function  
This function stores the present and previous values of the counter at each preset time interval while the signal is being input.
  - (d) Disable count function  
This function inputs a signal while executing the count enable command to stop pulse counting.

- (7) The preset function/counter selection function can be executed using an external control signal

By applying voltage to the preset terminal/function start terminal of an external terminal, preset function/counter function selection can be executed.

- (8) Easy settings using the utility package

A utility package is sold separately (GX Configurator-CT).

The utility package is not a required item. However, it can be used to set initial settings and automatic refresh settings onscreen, reduce sequence programs, and check settings and operating status.

- (9) A blown fuse in the external output section can be detected

A blown fuse in the external output section can be detected; it is notified by the input signal X and the LED display on the module.

## 2 SYSTEM CONFIGURATION

This section describes the systems to which the QD62 (E/D) can be applied.

### 2.1 Applicable Systems

This section explains the applicable system.

#### (1) Applicable modules and base units, and No. of modules

##### (a) When mounting to CPU module

The table below shows the CPU modules and base units applicable to the QD62 (E/D) and quantities for each CPU model.

Depending on the combination with other modules or the number of mounted modules, power supply capacity may be insufficient.

Pay attention to the power supply capacity before mounting modules, and if the power supply capacity is insufficient, change the combination of the modules.

| Applicable CPU module       |                             |           | No. of modules * 1 | Base unit * 2  |                     |
|-----------------------------|-----------------------------|-----------|--------------------|----------------|---------------------|
| CPU type                    |                             | CPU model |                    | Main base unit | Extension base unit |
| Programmable controller CPU | Basic model QCPU * 3        | Q00JCPU   | Up to 16           | ○              | ○                   |
|                             |                             | Q00CPU    | Up to 24           |                |                     |
|                             |                             | Q01CPU    |                    |                |                     |
|                             | High Performance model QCPU | Q02CPU    | Up to 64           | ○              | ○                   |
|                             |                             | Q02HCPU   |                    |                |                     |
|                             |                             | Q06HCPU   |                    |                |                     |
|                             |                             | Q12HCPU   |                    |                |                     |
|                             |                             | Q25HCPU   |                    |                |                     |
|                             | Process CPU                 | Q12PHCPU  | Up to 64           | ○              | ○                   |
|                             |                             | Q25PHCPU  |                    |                |                     |
|                             | Universal model QCPU        | Q02UCPU   | Up to 36           | ○              | ○                   |
|                             |                             | Q03UDCPU  | Up to 64           |                |                     |
|                             |                             | Q04UDHCPU |                    |                |                     |
|                             |                             | Q06UDHCPU |                    |                |                     |
|                             | Redundant CPU * 4           | Q12PRHCPU | Up to 53           | ×              | ○                   |
| Q25PRHCPU                   |                             |           |                    |                |                     |

○: Applicable, ×: N/A

\* 1: Limited within the range of I/O points for the CPU module

\* 2: Can be installed to any I/O slot of a base unit.

\* 3: For the coincidence detection interrupt function, use the CPU module of function version B or later.

\* 4: Use the QD62 (E/D) module whose first 5 digits of serial No. is "09012" or later.

## (b) Mounting to a MELSECNET/H remote I/O station

The following shows the mountable network modules, No. of mountable modules, and mountable base unit of the QD62 (E/D) module.

Power shortage may occur depending on the combination with other mounted modules or the number of mounted modules.

When mounting modules, pay attention to the power supply capacity.

When the power shortage occurs, review the combination of modules to be mounted.

| Mountable network module *3 | No. of mountable modules *1 | Mountable base unit *2               |                                           |
|-----------------------------|-----------------------------|--------------------------------------|-------------------------------------------|
|                             |                             | Main base unit of remote I/O station | Extension base unit of remote I/O station |
| QJ72LP25-25                 | Up to 64                    | ○                                    | ○                                         |
| QJ72LP25G                   |                             |                                      |                                           |
| QJ72LP25GE                  |                             |                                      |                                           |
| QJ72BR15                    |                             |                                      |                                           |

○: Mountable, x: Not mountable

\*1: Limited to the range of the number of I/O points in the network module.

\*2: Mountable on any I/O slot of the mountable base unit.

\*3: The coincidence detection interrupt function is not supported.

**REMARK**

The Basic model QCPU cannot create the MELSECNET/H remote I/O network.

## (2) Support of the multiple CPU system

When using the QD62 (E/D) in a multiple CPU system, refer to the following manual first.

- QCPU User's Manual (Function Explanation, Program Fundamentals)

If the QD62 (E/D) is used in a multiple CPU system, there are no restrictions depending on the module version.

Write intelligent function module parameters to only the control CPU of the QD62 (E/D).

## (3) Supported software packages

Relation between the system containing the QD62 (E/D) and software package is shown in the following table.

GX Developer is necessary when using the QD62 (E/D).

|                                                  |                      | Software Version       |                                                                                           |
|--------------------------------------------------|----------------------|------------------------|-------------------------------------------------------------------------------------------|
|                                                  |                      | GX Developer           | GX Configurator-CT                                                                        |
| Q00J/Q00/Q01CPU                                  | Single CPU system    | Version 7 or later     | Version 1.10L or later<br>(cannot be used with the SW0D5C-QCTU-E 50F or earlier versions) |
|                                                  | Multiple CPU system  | Version 8 or later     |                                                                                           |
| Q02/Q02H/Q06H/Q12H/Q25HCPU                       | Single CPU system    | Version 4 or later     | SW0D5C-QCTU-E 00A or later                                                                |
|                                                  | Multiple CPU system  | Version 6 or later     | SW0D5C-QCTU-E 50F or later                                                                |
| Q12PH/Q25PHCPU                                   | Single CPU system    | Version 7.10L or later | Version 1.13P or later<br>(cannot be used with the SW0D5C-QCTU-E 50F or earlier versions) |
|                                                  | Multiple CPU system  |                        |                                                                                           |
| Q12PRH/Q25PRHCPU                                 | Redundant CPU system | Version 8.45X or later | Version 1.16S or later                                                                    |
| Q02U/Q03UD/Q04UDH/Q06UDHCPU                      | Single CPU system    | Version 8.48A or later | Version 1.25AB or later                                                                   |
|                                                  | Multiple CPU system  |                        |                                                                                           |
| If installed in a MELSECNET/H remote I/O station |                      | Version 6 or later     | SW0D5C-QCTU-E 50F or later                                                                |

## (4) Connector

For the QD62(E/D), the connector is sold separately.

See Section 4.3 and make separate arrangements for the connector.

## 2.2 About Use of the QD62 (E/D) with the Q00J/Q00/Q01CPU

Here, use of the QD62 (E/D) with the Q00J/Q00/Q01CPU is explained.

## (1) Number of QD62 (E/D) that can be installed when the Q00J/Q00/Q01CPU is used

See Section 2.1 concerning the number of QD62 (E/D) that can be installed when the Q00J/Q00/Q01CPU is used.

## (2) Limitations when using the Q00J/Q00/Q01CPU

To use the coincidence detection interrupt function, use the Q00J/Q00/Q01CPU of function version B or later.

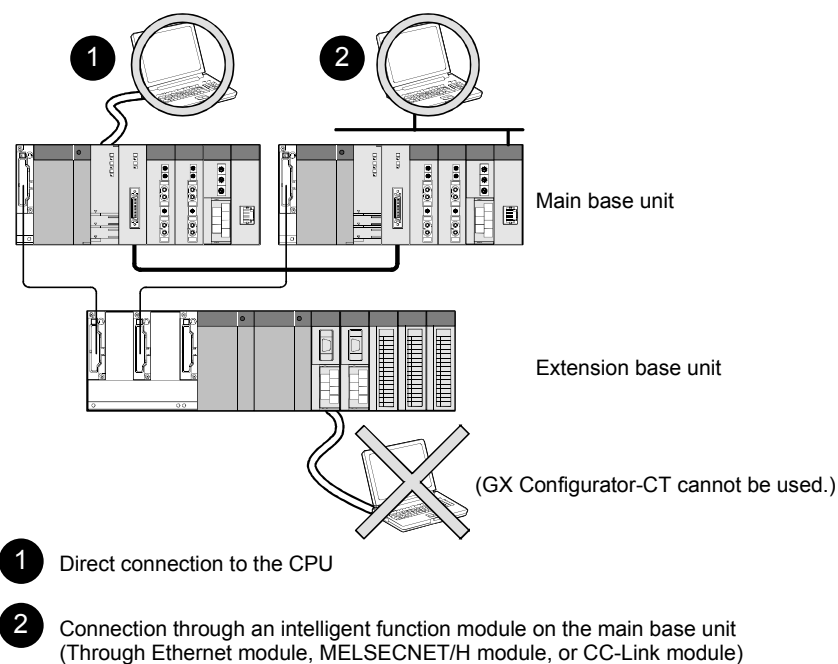
### 2.3 About Use of the QD62 (E/D) with the Q12PRH/Q25PRHCPU

Here, use of the QD62 (E/D) with the Q12PRH/Q25PRHCPU is explained.

#### (1) GX Configurator-CT

When using GX Developer to access the Q12PRH/Q25PRHCPU through the intelligent function module on the extension base unit, GX Configurator-CT cannot be used.

Connect a personal computer to the Q12PRH/Q25PRHCPU with a communication path indicated below.



### 2.4 About Use of the QD62 (E/D) on the MELSECNET/H Remote I/O Station

Here, use of the QD62 (E/D) on the MELSECNET/H remote I/O station is explained.

#### (1) Number of QD62 (E/D) that can be installed when the remote I/O station is used

See Section 2.1 concerning the number of QD62 (E/D) that can be installed when the remote I/O station is used.

#### (2) Limitations when using the remote I/O station

- (a) The coincidence detection interrupt function cannot be used.
- (b) When the QD62 (E/D) is used on the MELSECNET/H remote I/O station, a delay will occur due to the link scan time. Therefore, fully verify that there will be no problem with controllability in the target system.

Example) When processing is executed using the counter value input by a sequence program, variations will occur due to a delay in the link scan time.

## 2.5 How to Check Software Version

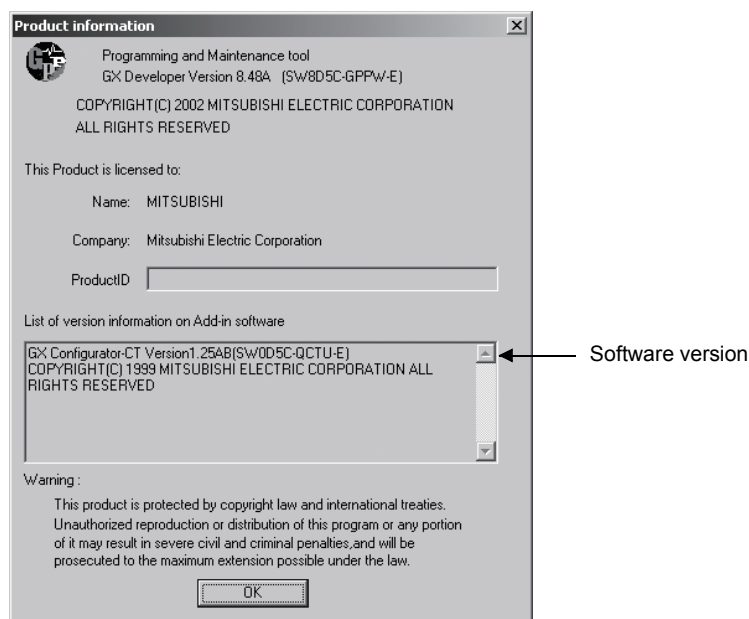
This section describes how to check the GX Configurator-CT software version.

## (1) Checking the software version of GX Configurator-CT

The software version of GX Configurator-CT can be checked GX Developer's "Product information" screen.

## [Operating procedure]

GX Developer → "Help" → Product information



(In the case of GX Developer Version 8)

**REMARK**

The version indication for the GX Configurator-CT has been changed as shown below from the SW0D5C-QCTU-E 50F upgrade product.

|                   |                                    |
|-------------------|------------------------------------|
| Previous product  | Upgrade and subsequent versions    |
| SW0D5C-QCTU-E 50F | → GX Configurator-CT Version 1.10L |

**POINT**

The serial No. on the rating plate may be different from the serial No. displayed on the product information screen of GX Developer.

- The serial No. on the rating plate indicates the management information of the product.
- The serial No. displayed on the product information screen of GX Developer indicates the function information of the product.

The function information of the product is updated when a new function is added.

## 3 SPECIFICATIONS

The following describes the performance specifications, I/O signals for the programmable controller CPU and buffer memory specifications of the QD62(E/D). For the general specifications of the QD62(E/D), see the User's Manual for the CPU module used.

## 3.1 Performance Specifications

The following describes the performance specifications of the QD62(E/D):

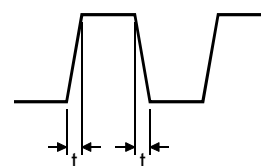
## (1) QD62 (DC input sinking output type) performance specifications

| Model name                         |                                             | QD62                                                                                    |                                                                                   |                                                                                  |
|------------------------------------|---------------------------------------------|-----------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|----------------------------------------------------------------------------------|
| Item                               |                                             |                                                                                         |                                                                                   |                                                                                  |
| Counting speed switch settings *1  |                                             | 200 k (100 k to 200 kPPS)                                                               | 100 k (10 k to 100 kPPS)                                                          | 10 k (10 kPPS or less)                                                           |
| I/O occupied points                |                                             | 16 points (I/O assignment: Intelligent 16 points)                                       |                                                                                   |                                                                                  |
| Number of channels                 |                                             | 2 channels                                                                              |                                                                                   |                                                                                  |
| Count input signal                 | Phase                                       | 1-phase input, 2-phase input                                                            |                                                                                   |                                                                                  |
|                                    | Signal level ( $\phi A$ , $\phi B$ )        | 5/12/24 V DC 2 to 5 mA                                                                  |                                                                                   |                                                                                  |
| Counter                            | Counting speed (max) *2                     | 200 kPPS                                                                                | 100 kPPS                                                                          | 10 kPPS                                                                          |
|                                    | Counting range                              | 32-bit signed binary values (–2147483648 to 2147483647)                                 |                                                                                   |                                                                                  |
|                                    | Model                                       | UP/DOWN Preset counter + Ring counter function                                          |                                                                                   |                                                                                  |
|                                    | Minimum count pulse width (Duty ratio 50 %) | <br>(Unit: $\mu s$ )<br>(Min. phase differential for 2-phase input: 1.25 $\mu s$ )      | <br>(Unit: $\mu s$ )<br>(Min. phase differential for 2-phase input: 2.5 $\mu s$ ) | <br>(Unit: $\mu s$ )<br>(Min. phase differential for 2-phase input: 25 $\mu s$ ) |
| Coincidence output                 | Comparison range                            | 32-bit signed binary values                                                             |                                                                                   |                                                                                  |
|                                    | Comparison result                           | Set value < Count value<br>Set value = Count value<br>Set value > Count value           |                                                                                   |                                                                                  |
| External input                     | Preset                                      | 5/12/24 V DC                                                                            |                                                                                   |                                                                                  |
|                                    | Function start                              | 2 to 5 mA                                                                               |                                                                                   |                                                                                  |
| External output                    | Coincidence output                          | Transistor (sinking type) output: 2 points/channel<br>12/24 V DC 0.5 A/point 2 A/common |                                                                                   |                                                                                  |
| 5V DC internal current consumption |                                             | 0.30 A                                                                                  |                                                                                   |                                                                                  |
| Weight                             |                                             | 0.11 kg                                                                                 |                                                                                   |                                                                                  |

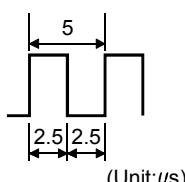
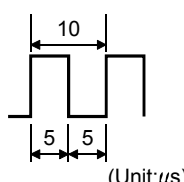
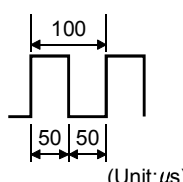
\*1: The counting speed switch settings can be set using the intelligent function module switch.

\*2: Counting speed is affected by pulse rise and fall time. Possible counting speeds are shown in the following table. Note that if a pulse that has a large rise and/or fall time is counted, a miscount may occur.

| Counting speed switch settings | 200 k                    | 100 k    | 10 k    |
|--------------------------------|--------------------------|----------|---------|
| Rise/fall time                 | Both 1 and 2 phase input |          |         |
| $t = 1.25 \mu s$ or less       | 200 kPPS                 | 100 kPPS | 10 kPPS |
| $t = 2.5 \mu s$ or less        | 100 kPPS                 | 100 kPPS | 10 kPPS |
| $t = 25 \mu s$ or less         | —                        | 10 kPPS  | 10 kPPS |
| $t = 500 \mu s$                | —                        | —        | 500 PPS |



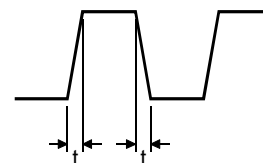
## (2) QD62E (DC input sourcing output type) performance specifications

| Model name                         |                                             | QD62E                                                                                                                                                               |                          |                        |
|------------------------------------|---------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|------------------------|
| Item                               |                                             |                                                                                                                                                                     |                          |                        |
| Counting speed switch settings *1  |                                             | 200 k (100 k to 200 kPPS)                                                                                                                                           | 100 k (10 k to 100 kPPS) | 10 k (10 kPPS or less) |
| I/O occupied points                |                                             | 16 points (I/O assignment: Intelligent 16 points)                                                                                                                   |                          |                        |
| Number of channels                 |                                             | 2 channels                                                                                                                                                          |                          |                        |
| Count input signal                 | Phase                                       | 1-phase input, 2-phase input                                                                                                                                        |                          |                        |
|                                    | Signal level ( $\phi A$ , $\phi B$ )        | 5/12/24 V DC 2 to 5 mA                                                                                                                                              |                          |                        |
| Counter                            | Counting speed (max) *2                     | 200 kPPS                                                                                                                                                            | 100 kPPS                 | 10 kPPS                |
|                                    | Counting range                              | 32-bit signed binary values (−2147483648 to 2147483647)                                                                                                             |                          |                        |
|                                    | Model                                       | UP/DOWN Preset counter + Ring counter function                                                                                                                      |                          |                        |
|                                    | Minimum count pulse width (Duty ratio 50 %) | <br>(Unit: $\mu s$ )<br>(Min. phase differential for 2-phase input: 1.25 $\mu s$ ) |                          |                        |
|                                    |                                             | <br>(Unit: $\mu s$ )<br>(Min. phase differential for 2-phase input: 2.5 $\mu s$ ) |                          |                        |
|                                    |                                             | <br>(Unit: $\mu s$ )<br>(Min. phase differential for 2-phase input: 25 $\mu s$ ) |                          |                        |
| Coincidence output                 | Comparison range                            | 32-bit signed binary values                                                                                                                                         |                          |                        |
|                                    | Comparison result                           | Set value < Count value<br>Set value = Count value<br>Set value > Count value                                                                                       |                          |                        |
| External input                     | Preset                                      | 5/12/24 V DC                                                                                                                                                        |                          |                        |
|                                    | Function start                              | 2 to 5 mA                                                                                                                                                           |                          |                        |
| External output                    | Coincidence output                          | Transistor (sourcing type) output: 2 points/channel<br>12/24 V DC 0.1 A/point 0.4 A/common                                                                          |                          |                        |
| 5V DC internal current consumption |                                             | 0.33 A                                                                                                                                                              |                          |                        |
| Weight                             |                                             | 0.11 kg                                                                                                                                                             |                          |                        |

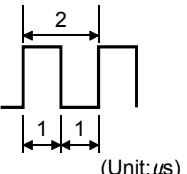
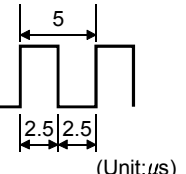
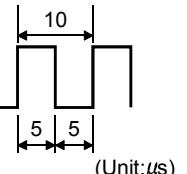
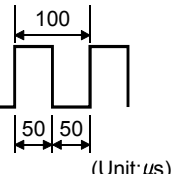
\*1: The counting speed switch settings can be set using the intelligent function module switch.

\*2: Counting speed is affected by pulse rise and fall time. Possible counting speeds are shown in the following table. Note that if a pulse that has a large rise and/or fall time is counted, a miscount may occur.

| Counting speed switch settings | 200 k                    | 100 k    | 10 k    |
|--------------------------------|--------------------------|----------|---------|
| Rise/fall time                 | Both 1 and 2 phase input |          |         |
| $t = 1.25 \mu s$ or less       | 200 kPPS                 | 100 kPPS | 10 kPPS |
| $t = 2.5 \mu s$ or less        | 100 kPPS                 | 100 kPPS | 10 kPPS |
| $t = 25 \mu s$ or less         | —                        | 10 kPPS  | 10 kPPS |
| $t = 500 \mu s$                | —                        | —        | 500 PPS |



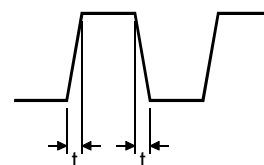
## (3) QD62D (differential input sinking output type) performance specifications

| Model name                          |                                             | QD62D                                                                                                                                                              |                                                                                                                                                                     |                                                                                                                                                                      |                                                                                                                                                                     |
|-------------------------------------|---------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Item                                |                                             | 500 k<br>(200 k to 500 kPPS)                                                                                                                                       | 200 k<br>(100 k to 200 kPPS)                                                                                                                                        | 100 k<br>(10 k to 100 kPPS)                                                                                                                                          | 10 k<br>(10 kPPS or less)                                                                                                                                           |
| Counting speed switch settings *1   |                                             |                                                                                                                                                                    |                                                                                                                                                                     |                                                                                                                                                                      |                                                                                                                                                                     |
| I/O occupied points                 |                                             | 16 points (I/O assignment: Intelligent 16 points)                                                                                                                  |                                                                                                                                                                     |                                                                                                                                                                      |                                                                                                                                                                     |
| Number of channels                  |                                             | 2 channels                                                                                                                                                         |                                                                                                                                                                     |                                                                                                                                                                      |                                                                                                                                                                     |
| Count input signal                  | Phase                                       | 1-phase input, 2-phase input                                                                                                                                       |                                                                                                                                                                     |                                                                                                                                                                      |                                                                                                                                                                     |
|                                     | Signal level ( $\phi A$ , $\phi B$ )        | EIA Standard RS-422-A<br>Differential line driver level (Am26LS31 [manufactured by Texas Instruments] or equivalent)                                               |                                                                                                                                                                     |                                                                                                                                                                      |                                                                                                                                                                     |
| Counter                             | Counting speed (max) *2                     | 500 kPPS                                                                                                                                                           | 200 kPPS                                                                                                                                                            | 100 kPPS                                                                                                                                                             | 10 kPPS                                                                                                                                                             |
|                                     | Counting range                              | 32-bit signed binary values (–2147483648 to 2147483647)                                                                                                            |                                                                                                                                                                     |                                                                                                                                                                      |                                                                                                                                                                     |
|                                     | Model                                       | UP/DOWN Preset counter + Ring counter function                                                                                                                     |                                                                                                                                                                     |                                                                                                                                                                      |                                                                                                                                                                     |
|                                     | Minimum count pulse width (Duty ratio 50 %) | <br>(Unit: $\mu s$ )<br>(Min. phase differential for 2-phase input: 0.5 $\mu s$ ) | <br>(Unit: $\mu s$ )<br>(Min. phase differential for 2-phase input: 1.25 $\mu s$ ) | <br>(Unit: $\mu s$ )<br>(Min. phase differential for 2-phase input: 2.5 $\mu s$ ) | <br>(Unit: $\mu s$ )<br>(Min. phase differential for 2-phase input: 25 $\mu s$ ) |
| Coincidence output                  | Comparison range                            | 32-bit signed binary values                                                                                                                                        |                                                                                                                                                                     |                                                                                                                                                                      |                                                                                                                                                                     |
|                                     | Comparison result                           | Set value < Count value<br>Set value = Count value<br>Set value > Count value                                                                                      |                                                                                                                                                                     |                                                                                                                                                                      |                                                                                                                                                                     |
| External input                      | Preset                                      | 5/12/24 V DC 2 to 5 mA<br>(EIA Standard RS-422-A Differential Line Driver may be connected)                                                                        |                                                                                                                                                                     |                                                                                                                                                                      |                                                                                                                                                                     |
|                                     | Function start                              |                                                                                                                                                                    |                                                                                                                                                                     |                                                                                                                                                                      |                                                                                                                                                                     |
| External output                     | Coincidence output                          | Transistor (sinking type) output: 2 points/channel<br>12/24 V DC 0.5 A/point 2 A/common                                                                            |                                                                                                                                                                     |                                                                                                                                                                      |                                                                                                                                                                     |
| 5 V DC internal current consumption |                                             | 0.38 A                                                                                                                                                             |                                                                                                                                                                     |                                                                                                                                                                      |                                                                                                                                                                     |
| Weight                              |                                             | 0.12 kg                                                                                                                                                            |                                                                                                                                                                     |                                                                                                                                                                      |                                                                                                                                                                     |

\*1: The counting speed switch settings can be set using the intelligent function module switch.

\*2: Counting speed is affected by pulse rise and fall time. Possible counting speeds are shown in the following table. Note that if a pulse that has a large rise and/or fall time is counted, a miscount may occur.

| Counting speed switch settings | 500 k                    | 200 k    | 100 k    | 10 k    |
|--------------------------------|--------------------------|----------|----------|---------|
| Rise/fall time                 | Both 1 and 2 phase input |          |          |         |
| $t = 0.5 \mu s$ or less        | 500 kPPS                 | 200 kPPS | 100 kPPS | 10 kPPS |
| $t = 1.25 \mu s$ or less       | 200 kPPS                 | 200 kPPS | 100 kPPS | 10 kPPS |
| $t = 2.5 \mu s$ or less        | —                        | 100 kPPS | 100 kPPS | 10 kPPS |
| $t = 25 \mu s$ or less         | —                        | —        | 10 kPPS  | 10 kPPS |
| $t = 500 \mu s$                | —                        | —        | —        | 500 PPS |



## 3.2 Function List

The QD62(E/D) functions are listed below.

| Name                                     |                                 | Function                                                                                                                                                                                | Reference section |
|------------------------------------------|---------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|
| Linear counter function                  |                                 | Values from –2147483648 to 2147483647 can be counted. If the count exceeds the range, this function detects an overflow.                                                                | Section 5.2.1     |
| Ring counter function                    |                                 | Repeatedly executes counting between the ring counter maximum and minimum values.                                                                                                       | Section 5.2.2     |
| Coincidence output function              |                                 | Compares the coincidence output point of any preset channel with the present counter value, and outputs the ON/OFF signal.                                                              | Section 5.3       |
| Coincidence detection interrupt function |                                 | Generates an interrupt signal to the programmable controller CPU when coincidence is detected, and starts the interrupt program.                                                        |                   |
| Preset function                          |                                 | Rewrites the present counter value to any numeric value.<br>Performs preset using the sequence program or external preset input.                                                        | Section 5.4       |
| Counter function selection               | Disable count function          | Stops the pulse count while the count enable command is being executed.                                                                                                                 | Section 6.2       |
|                                          | Latch counter function          | Stores the present counter value at the time the counter function selection start command signal is input in the buffer memory.                                                         | Section 6.3       |
|                                          | Sampling counter function       | Counts the pulses that are input during the preset sampling time period from the time the counter function selection start command is input, and stores the count in the buffer memory. | Section 6.4       |
|                                          | Periodic pulse counter function | While the counter function selection start command signal is being input, stores the present value in the buffer memory at preset interval.                                             | Section 6.5       |

\* The functions can be used in combination. However, only either one of the linear counter function or ring counter function can be used, and only one of the four counter functions can be selected.

## 3.3 I/O Signals for the Programmable Controller CPU

## 3.3.1 List of I/O signals

The I/O signals for the QD62(E/D) programmable controller CPU are listed in the table below.

For the I/O numbers (X/Y) and I/O addresses indicated in this and succeeding sections, it is assumed that the QD62(E/D) is mounted into I/O slot 0 of the standard base module.

| Input signal (Signal direction QD62(E/D)<br>→ programmable controller CPU) |                                          | Output signal (Signal direction programmable<br>controller CPU → QD62(E/D)) |                                          |
|----------------------------------------------------------------------------|------------------------------------------|-----------------------------------------------------------------------------|------------------------------------------|
| Device No.                                                                 | Signal name                              | Device No.                                                                  | Signal name                              |
| X00                                                                        | Module ready                             | Y00                                                                         | Coincidence signal No. 1 reset command   |
| X01                                                                        | CH1<br>Counter value large (point No. 1) | Y01                                                                         | Preset command                           |
| X02                                                                        |                                          | Y02                                                                         | Coincidence signal enable command        |
| X03                                                                        |                                          | Y03                                                                         | Down count command                       |
| X04                                                                        |                                          | Y04                                                                         | Count enable command                     |
| X05                                                                        |                                          | Y05                                                                         | External preset detection reset command  |
| X06                                                                        |                                          | Y06                                                                         | Counter function selection start command |
| X07                                                                        |                                          | Y07                                                                         | Coincidence signal No. 2 reset command   |
| X08                                                                        | CH2<br>Counter value large (point No. 1) | Y08                                                                         | Coincidence signal No. 1 reset command   |
| X09                                                                        |                                          | Y09                                                                         | Preset command                           |
| X0A                                                                        |                                          | Y0A                                                                         | Coincidence signal enable command        |
| X0B                                                                        |                                          | Y0B                                                                         | Down count command                       |
| X0C                                                                        |                                          | Y0C                                                                         | Count enable command                     |
| X0D                                                                        |                                          | Y0D                                                                         | External preset detection reset command  |
| X0E                                                                        |                                          | Y0E                                                                         | Counter function selection start command |
| X0F                                                                        | Fuse broken detection flag               | Y0F                                                                         | Coincidence signal No. 2 reset command   |

## 3.3.2 Functions of I/O signals

The details of the I/O signals for the QD62(E/D) are listed in the table below.

## (1) Input signals

| Device No. |     | Signal name<br>QD62(E/D) →<br>programmable controller CPU | Description                                                                                                                                                                                                                                                                                                                                                                            |
|------------|-----|-----------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| CH1        | CH2 |                                                           |                                                                                                                                                                                                                                                                                                                                                                                        |
| X00        |     | Module ready                                              | Turns ON when the count preparation for QD62(E/D) is completed at the time of programmable controller CPU power on or reset operation, and count processing is performed.<br>When Module ready (X00) is OFF, count processing is not performed.                                                                                                                                        |
| X01        | X08 | Counter value large (point No.1)                          | Turns ON when the present value (CH1: 2H to 3H, CH2: 22H to 23H) > coincidence output point No. 1 setting (CH1: 4H to 5H, CH2: 24H to 25H).<br>Turns OFF when the present value $\leq$ coincidence output point No.1 setting.                                                                                                                                                          |
| X02        | X09 | Counter value coincidence (point No.1)                    | Turns ON when the present value = coincidence output point No.1 setting and the present value is latched.<br>Turns OFF with the coincidence signal No.1 reset command (Y00/Y08).<br>The counter value coincidence (point No.1) turns ON immediately after power-ON or reset of the programmable controller CPU, since the present value and coincidence output point No.1 are all '0'. |
| X03        | X0A | Counter value small (point No.1)                          | Turns ON when the present value < coincidence output point No.1 setting.<br>Turns OFF when the present value $\geq$ coincidence output point No.1 setting.                                                                                                                                                                                                                             |
| X04        | X0B | External preset request detection                         | Turns ON with a preset command signal from the external input terminal, and the request is latched.<br>Turns OFF with the external preset detection reset signal (Y05/Y0D).                                                                                                                                                                                                            |
| X05        | X0C | Counter value large (point No.2)                          | Turns ON when the present value > coincidence output point No.2 setting (CH1: 6H to 7H, CH2: 26H to 27H).<br>Turns OFF when the present value $\leq$ coincidence output point No.2 setting.                                                                                                                                                                                            |
| X06        | X0D | Counter value coincidence (point No.2)                    | Turns ON when the present value = coincidence output point No.2 setting and the present value is latched.<br>Turns OFF with the coincidence signal No.2 reset command (Y07/Y0F).<br>The counter value coincidence (point No.2) turns ON immediately after power-ON or reset of the programmable controller CPU, since the present value and coincidence output point No.2 are all '0'. |
| X07        | X0E | Counter value small (point No.2)                          | Turns ON when the present value < coincidence output point No.2 setting.<br>Turns OFF when the present value $\geq$ coincidence output point No.2 setting.                                                                                                                                                                                                                             |
| X0F        |     | Fuse broken detection flag                                | Fuse broken detection flag (X0F) turns ON when a fuse in the coincidence signal output section is blown.                                                                                                                                                                                                                                                                               |

## (2) Output signals

| Device No. |     | Signal name<br>programmable controller CPU<br>→ QD62 (E/D) | Operation<br>timing                                                                 | Description                                                                                                                                                                                                                                                                                             |
|------------|-----|------------------------------------------------------------|-------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| CH1        | CH2 |                                                            |                                                                                     |                                                                                                                                                                                                                                                                                                         |
| Y00        | Y08 | Coincidence signal No.1 reset command                      |    | Turns ON when the counter value coincidence (point No.1) signal (X02/X09) is reset.                                                                                                                                                                                                                     |
| Y01        | Y09 | Preset command                                             |    | Turns ON when the preset function is executed.                                                                                                                                                                                                                                                          |
| Y02        | Y0A | Coincidence signal enable command                          |    | Turns ON when the counter value coincidence signal (X02/X09, X06/X0D) is output to the external terminal.                                                                                                                                                                                               |
| Y03        | Y0B | Down count command                                         |    | Turns ON when a subtraction count is executed in the 1 phase pulse input mode.<br>If either phase B pulse is input or the down count command (Y03/Y0B) turns ON, the subtraction count is performed.<br>Check that the phase B pulse is input and the down count command (Y03/Y0B) is OFF for addition. |
| Y04        | Y0C | Count enable command                                       |    | Turns ON when the count operation is performed.                                                                                                                                                                                                                                                         |
| Y05        | Y0D | External preset detection reset command                    |   | Turns ON when the external preset request detection signal (X04/X0B) is reset.                                                                                                                                                                                                                          |
| Y06        | Y0E | Counter function selection start command                   |                                                                                     | Turns ON when counter function selection is executed.                                                                                                                                                                                                                                                   |
|            |     |                                                            |  | <ul style="list-style-type: none"> <li>• Latch counter function</li> <li>• Sampling counter function</li> </ul>                                                                                                                                                                                         |
|            |     |                                                            |  | <ul style="list-style-type: none"> <li>• Count disable function</li> <li>• Periodic pulse counter function</li> </ul>                                                                                                                                                                                   |
| Y07        | Y0F | Coincidence signal No.2 reset command                      |  | Turns ON when the counter value coincidence (point No.2) signal (X06/X0D) is reset.                                                                                                                                                                                                                     |

**REMARK**

The symbols used in the operation timing column signify the following:

-  ..... Enabled while the signal is in ON status.
-  ..... Enabled at signal rise (from OFF to ON).

## 3.4 Buffer Memory Assignments

## (1) Buffer memory assignment list

Buffer memory assignments (without battery backup) for the QD62 (E/D) are listed in the table below.

The initial values are set for the buffer memory when the power is turned on or the programmable controller CPU is reset.

The contents of the buffer memory can be read/written using the FROM/TO commands in the sequence program or the automatic refresh function of the programmable controller CPU.

| Address          |                |                  |                | Set data                            |     | Initial value<br>※1 | Read/write            |
|------------------|----------------|------------------|----------------|-------------------------------------|-----|---------------------|-----------------------|
| CH1              |                | CH2              |                |                                     |     |                     |                       |
| Hexadecimal      | Decimal        | Hexadecimal      | Decimal        |                                     |     |                     |                       |
| 0H               | 0              | 20H              | 32             | Preset value setting                | (L) | 0                   | Read/write<br>enabled |
| 1H               | 1              | 21H              | 33             |                                     | (H) |                     |                       |
| 2H               | 2              | 22H              | 34             | Present value                       | (L) | 0                   | Read only             |
| 3H               | 3              | 23H              | 35             |                                     | (H) |                     |                       |
| 4H               | 4              | 24H              | 36             | Coincidence output point set No. 1  | (L) | 0                   | Read/write<br>enabled |
| 5H               | 5              | 25H              | 37             |                                     | (H) |                     |                       |
| 6H               | 6              | 26H              | 38             | Coincidence output point set No. 2  | (L) |                     |                       |
| 7H               | 7              | 27H              | 39             |                                     | (H) |                     |                       |
| 8H               | 8              | 28H              | 40             | Overflow detection flag             |     | 0                   | Read only             |
| 9H               | 9              | 29H              | 41             | Counter function selection setting  |     | 0                   | Read/write<br>enabled |
| AH               | 10             | 2AH              | 42             | Sampling/periodic setting           |     |                     |                       |
| BH               | 11             | 2BH              | 43             | Sampling/periodic counter flag      |     | 0                   | Read only             |
| CH               | 12             | 2CH              | 44             | Latch count value                   | (L) |                     |                       |
| DH               | 13             | 2DH              | 45             |                                     | (H) |                     |                       |
| EH               | 14             | 2EH              | 46             | Sampling count value                | (L) |                     |                       |
| FH               | 15             | 2FH              | 47             |                                     | (H) |                     |                       |
| 10H              | 16             | 30H              | 48             | Periodic pulse count previous value | (L) |                     |                       |
| 11H              | 17             | 31H              | 49             |                                     | (H) |                     |                       |
| 12H              | 18             | 32H              | 50             | Periodic pulse count present value  | (L) |                     |                       |
| 13H              | 19             | 33H              | 51             |                                     | (H) |                     |                       |
| 14H              | 20             | 34H              | 52             | Ring counter minimum value          | (L) | 0                   | Read/write<br>enabled |
| 15H              | 21             | 35H              | 53             |                                     | (H) |                     |                       |
| 16H              | 22             | 36H              | 54             | Ring counter maximum value          | (L) |                     |                       |
| 17H              | 23             | 37H              | 55             |                                     | (H) |                     |                       |
| 18H<br>to<br>1FH | 24<br>to<br>31 | 38H<br>to<br>3FH | 56<br>to<br>63 | System area                         |     | —                   | —                     |

\*1: The initial values are set when the power is turned on or the programmable controller CPU is reset.

- (2) Preset value setting (Buffer memory addresses CH1: 0H to 1H, CH2: 20H to 21H)
- This area is used to set the values that are preset in the counter.
  - The setting range is from –2147483648 to 2147483647 (32-bit signed binary values).
- (3) Present value (Buffer memory addresses CH1: 2H to 3H, CH2: 22H to 23H)
- The present values for the counter are stored.
  - The range of the values that are read is from –2147483648 to 2147483647 (32-bit signed binary values).
- (4) Coincidence output point set No.1 and No.2 (Buffer memory addresses CH1: 4H to 7H, CH2: 24H to 27H)
- This area is used to write the setting values of the coincidence output points to be compared with the present counter value.
  - No.1 and No.2 coincidence output points can be set for each channel.
  - The setting range is from –2147483648 to 2147483647 (32-bit signed binary value).
- (5) Overflow detection flag (Buffer memory addresses CH1: 8H, CH2: 28H)
- A counter overflow occurrence status is stored when the counter format is linear counter.
  - The following values corresponding to the overflow occurrence status are stored in this area.

| Condition             | Buffer memory content |
|-----------------------|-----------------------|
| No overflow detection | 0                     |
| Overflow occurred     | 1                     |

- (6) Counter function selection setting (Buffer memory addresses CH1: 9H, CH2: 29H)
- This area is used to set the data for which a counter function is selected.
  - The relationships between the selected counter function and set value are shown below.

| Counter function selection      | Set value |
|---------------------------------|-----------|
| Count disable function          | 0         |
| Latch counter function          | 1         |
| Sampling counter function       | 2         |
| Periodic pulse counter function | 3         |

## (7) Sampling/periodic setting (Buffer memory addresses CH1: AH, CH2: 2AH)

- This area is used to write the time setting values of the sampling counter function and periodic pulse counter function during counter function selection.
- The setting range is from 1 to 65535 (16-bit binary values) and the time unit is 10[ms].

Example) When 420 is set for the sampling/periodic setting in the buffer memory

$$420 \times 10 = 4200 \text{ [ms]}$$

## (8) Sampling/periodic counter flag (Buffer memory addresses CH1: BH, CH2: 2BH)

- This area is used to store the function operating status while the sampling counter function and periodic pulse counter function are being executed during counter function selection.
- One of the values corresponding to the function operation status shown in the table below is stored in this area.

| Operating status   | Buffer memory content |
|--------------------|-----------------------|
| Idling function    | 0                     |
| Executing function | 1                     |

## (9) Latch count value (Buffer memory addresses CH1: CH to DH, CH2: 2CH to 2DH)

- This area is used to store the latch count values when the latch counter function is executed.
- The range of the values to be read is from -2147483648 to 2147483647 (32-bit signed binary values).

## (10) Sampling count value (Buffer memory addresses CH1: EH to FH, CH2: 2EH to 2FH)

- This area is used to store the sampling count values when the sampling counter function is executed.
- The range of the values to be read is from -2147483648 to 2147483647 (32-bit signed binary values).

## (11) Periodic pulse count previous and present value

(Buffer memory addresses CH1: 10H to 13H, CH2: 30H to 33H)

- This area is used to store the present and previous values for the periodic pulse count when the periodic pulse counter function is executed.
- The range of the values to be read is from -2147483648 to 2147483647 (32-bit signed binary values).

## (12) Ring counter minimum and maximum value

(Buffer memory addresses CH1: 14H to 17H, CH2: 34H to 37H)

- This area is used to set the count range when the counter format is ring counter.
- The setting range is from -2147483648 to 2147483647 (32-bit signed binary values).

## 3.5 Interface with External Devices

The table below lists the external device interface for the QD62(E/D).

## (1) QD62 (DC input sinking output type)

| I/O classification | Internal circuit | Terminal number * 1 |     | Signal name                              | Operation                                                                                                            | Input voltage (guaranteed value) | Operating current (guaranteed value) |
|--------------------|------------------|---------------------|-----|------------------------------------------|----------------------------------------------------------------------------------------------------------------------|----------------------------------|--------------------------------------|
|                    |                  | CH1                 | CH2 |                                          |                                                                                                                      |                                  |                                      |
| Input              |                  | A20                 | A13 | Phase A pulse input 24 V                 | When ON                                                                                                              | 21.6 to 26.4 V                   | 2 to 5 mA                            |
|                    |                  |                     |     |                                          | When OFF                                                                                                             | 5 V or less                      | 0.1 mA or less                       |
|                    |                  | B20                 | B13 | Phase A pulse input 12 V                 | When ON                                                                                                              | 10.8 to 13.2 V                   | 2 to 5 mA                            |
|                    |                  |                     |     |                                          | When OFF                                                                                                             | 4 V or less                      | 0.1 mA or less                       |
|                    |                  | A19                 | A12 | Phase A pulse input 5 V                  | When ON                                                                                                              | 4.5 to 5.5 V                     | 2 to 5 mA                            |
|                    |                  |                     |     |                                          | When OFF                                                                                                             | 2 V or less                      | 0.1 mA or less                       |
|                    |                  | B19                 | B12 | ABCOM                                    | —                                                                                                                    |                                  |                                      |
|                    |                  | A18                 | A11 | Phase B pulse input 24 V                 | When ON                                                                                                              | 21.6 to 26.4 V                   | 2 to 5 mA                            |
|                    |                  |                     |     |                                          | When OFF                                                                                                             | 5 V or less                      | 0.1 mA or less                       |
|                    |                  | B18                 | B11 | Phase B pulse input 12 V                 | When ON                                                                                                              | 10.8 to 13.2 V                   | 2 to 5 mA                            |
|                    |                  |                     |     |                                          | When OFF                                                                                                             | 4 V or less                      | 0.1 mA or less                       |
|                    |                  | A17                 | A10 | Phase B pulse input 5 V                  | When ON                                                                                                              | 4.5 to 5.5 V                     | 2 to 5 mA                            |
|                    |                  |                     |     |                                          | When OFF                                                                                                             | 2 V or less                      | 0.1 mA or less                       |
|                    |                  | —                   | —   | —                                        | —                                                                                                                    |                                  |                                      |
|                    |                  | B17                 | B10 | Preset input 24 V                        | When ON                                                                                                              | 21.6 to 26.4 V                   | 2 to 5 mA                            |
|                    |                  |                     |     |                                          | When OFF                                                                                                             | 5 V or less                      | 0.1 mA or less                       |
|                    |                  | A16                 | A09 | Preset input 12 V                        | When ON                                                                                                              | 10.8 to 13.2 V                   | 2 to 5 mA                            |
|                    |                  |                     |     |                                          | When OFF                                                                                                             | 4 V or less                      | 0.1 mA or less                       |
|                    |                  | B16                 | B09 | Preset input 5 V                         | When ON                                                                                                              | 4.5 to 5.5 V                     | 2 to 5 mA                            |
|                    |                  |                     |     |                                          | When OFF                                                                                                             | 2 V or less                      | 0.1 mA or less                       |
|                    |                  | A15                 | B08 | CTRLCOM                                  | Response time                                                                                                        | OFF → ON<br>0.5 ms or less       | ON → OFF<br>1 ms or less             |
|                    |                  | B15                 | B08 | Function start input 24 V                | When ON                                                                                                              | 21.6 to 26.4 V                   | 2 to 5 mA                            |
|                    |                  |                     |     |                                          | When OFF                                                                                                             | 5 V or less                      | 0.1 mA or less                       |
|                    |                  | A14                 | A07 | Function start input 12 V                | When ON                                                                                                              | 10.8 to 13.2 V                   | 2 to 5 mA                            |
|                    |                  |                     |     |                                          | When OFF                                                                                                             | 4 V or less                      | 0.1 mA or less                       |
|                    |                  | B14                 | B07 | Function start input 5 V                 | When ON                                                                                                              | 4.5 to 5.5 V                     | 2 to 5 mA                            |
|                    |                  |                     |     |                                          | When OFF                                                                                                             | 2 V or less                      | 0.1 mA or less                       |
|                    |                  | —                   | —   | —                                        | Response time                                                                                                        | OFF → ON<br>0.5 ms or less       | ON → OFF<br>1 ms or less             |
| Output             |                  | A06                 | A05 | EQU1<br>(Coincidence output point No. 1) | Operating voltage 10.2 to 30 V<br>Maximum load current 0.5 A/point, 2 A/common<br>Maximum voltage drop when ON 1.5 V |                                  |                                      |
|                    |                  | B06                 | B05 | EQU2<br>(Coincidence output point No. 2) | Response time OFF → ON 0.1 ms or less<br>ON → OFF 0.1 ms or less (rated load, resistive load)                        |                                  |                                      |
|                    |                  | B02, B01            |     | 12/24 V                                  | Input voltage 10.2 to 30 V                                                                                           |                                  |                                      |
|                    |                  | A02, A01            |     | 0 V                                      | Current consumption 8 mA (TYP 24 V DC)                                                                               |                                  |                                      |

\* 1: Terminal numbers A03, A04, B03 and B04 are not used.

## (2) QD62E (DC input sourcing output type)

| I/O classification | Internal circuit | Terminal number * 1 |     | Signal name                              | Operation                    | Input voltage (guaranteed value) | Operating current (guaranteed value)        |
|--------------------|------------------|---------------------|-----|------------------------------------------|------------------------------|----------------------------------|---------------------------------------------|
|                    |                  | CH1                 | CH2 |                                          |                              |                                  |                                             |
| Input              |                  | A20                 | A13 | Phase A pulse input 24 V                 | When ON                      | 21.6 to 26.4 V                   | 2 to 5 mA                                   |
|                    |                  |                     |     |                                          | When OFF                     | 5 V or less                      | 0.1 mA or less                              |
|                    |                  | B20                 | B13 | Phase A pulse input 12 V                 | When ON                      | 10.8 to 13.2 V                   | 2 to 5 mA                                   |
|                    |                  |                     |     |                                          | When OFF                     | 4 V or less                      | 0.1 mA or less                              |
|                    |                  | A19                 | A12 | Phase A pulse input 5 V                  | When ON                      | 4.5 to 5.5 V                     | 2 to 5 mA                                   |
|                    |                  |                     |     |                                          | When OFF                     | 2 V or less                      | 0.1 mA or less                              |
|                    |                  | B19                 | B12 | ABCOM                                    | —                            |                                  |                                             |
|                    |                  | A18                 | A11 | Phase B pulse input 24 V                 | When ON                      | 21.6 to 26.4 V                   | 2 to 5 mA                                   |
|                    |                  |                     |     |                                          | When OFF                     | 5 V or less                      | 0.1 mA or less                              |
|                    |                  | B18                 | B11 | Phase B pulse input 12 V                 | When ON                      | 10.8 to 13.2 V                   | 2 to 5 mA                                   |
|                    |                  |                     |     |                                          | When OFF                     | 4 V or less                      | 0.1 mA or less                              |
|                    |                  | A17                 | A10 | Phase B pulse input 5 V                  | When ON                      | 4.5 to 5.5 V                     | 2 to 5 mA                                   |
|                    |                  |                     |     |                                          | When OFF                     | 2 V or less                      | 0.1 mA or less                              |
|                    |                  | —                   | —   | —                                        | —                            |                                  |                                             |
|                    |                  | B17                 | B10 | Preset input 24 V                        | When ON                      | 21.6 to 26.4 V                   | 2 to 5 mA                                   |
|                    |                  |                     |     |                                          | When OFF                     | 5 V or less                      | 0.1 mA or less                              |
|                    |                  | A16                 | A09 | Preset input 12 V                        | When ON                      | 10.8 to 13.2 V                   | 2 to 5 mA                                   |
|                    |                  |                     |     |                                          | When OFF                     | 4 V or less                      | 0.1 mA or less                              |
|                    |                  | B16                 | B09 | Preset input 5 V                         | When ON                      | 4.5 to 5.5 V                     | 2 to 5 mA                                   |
|                    |                  |                     |     |                                          | When OFF                     | 2 V or less                      | 0.1 mA or less                              |
|                    |                  | A15                 | B08 | CTRLCOM                                  | Response time                | OFF → ON<br>0.5 ms or less       | ON → OFF<br>1 ms or less                    |
|                    |                  | B15                 | B08 | Function start input 24 V                | When ON                      | 21.6 to 26.4 V                   | 2 to 5 mA                                   |
|                    |                  |                     |     |                                          | When OFF                     | 5 V or less                      | 0.1 mA or less                              |
|                    |                  | A14                 | A07 | Function start input 12 V                | When ON                      | 10.8 to 13.2 V                   | 2 to 5 mA                                   |
|                    |                  |                     |     |                                          | When OFF                     | 4 V or less                      | 0.1 mA or less                              |
|                    |                  | B14                 | B07 | Function start input 5 V                 | When ON                      | 4.5 to 5.5 V                     | 2 to 5 mA                                   |
|                    |                  |                     |     |                                          | When OFF                     | 2 V or less                      | 0.1 mA or less                              |
|                    |                  | —                   | —   | —                                        | Response time                | OFF → ON<br>0.5 ms or less       | ON → OFF<br>1 ms or less                    |
| Output             |                  | A06                 | A05 | EQU1<br>(Coincidence output point No. 1) | Operating voltage            | 10.2 to 30 V                     |                                             |
|                    |                  |                     |     |                                          | Maximum load current         | 0.1 A/point, 0.4 A/common        |                                             |
|                    |                  |                     |     |                                          | Maximum voltage drop when ON | 1.5 V                            |                                             |
|                    |                  | B06                 | B05 | EQU2<br>(Coincidence output point No. 2) | Response time                | OFF → ON                         | 0.3 ms or less                              |
|                    |                  |                     |     |                                          |                              | ON → OFF                         | 0.3 ms or less (rated load, resistive load) |
|                    |                  | B02, B01            |     | 12/24 V                                  | Input voltage                | 10.2 to 30 V                     |                                             |
|                    |                  | A02, A01            |     | 0 V                                      | Current consumption          | 8 mA (TYP 24 V DC)               |                                             |

\*1: Terminal numbers A03, A04, B03 and B04 are not used.

## (3) QD62D (Differential input sinking output type)

| I/O classification | Internal circuit | Terminal number * 1 |     | Signal name                              | Operation                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Input voltage (guaranteed value) | Operating current (guaranteed value) |
|--------------------|------------------|---------------------|-----|------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------|--------------------------------------|
|                    |                  | CH1                 | CH2 |                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                  |                                      |
| Input              |                  | A20                 | A14 | Phase A pulse input                      | Line driver level (Am26LS31 [manufactured by Texas Instruments] or equivalent) that conforms to RS-422-A in EIA Standard<br>EIA standard RS-422-A line driver level<br>Equivalent to Am26LS31 (made by Japan Texas Instruments, Inc.)<br>$V_{hys}$ Hysteresis (VT+ - VT-) 60 mV<br>$V_{IH(E)}$ "H" level enable input voltage: 2 V or higher<br>$V_{IL(E)}$ "L" level enable input voltage: 0.8 V or lower<br>* A current type line driver cannot be used. |                                  |                                      |
|                    |                  | B20                 | B14 | Phase $\bar{A}$ pulse input              |                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                  |                                      |
|                    |                  | A19                 | A13 | Phase B pulse input                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                  |                                      |
|                    |                  | A19                 | B13 | Phase $\bar{B}$ pulse input              |                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                  |                                      |
|                    |                  | A18                 | A12 | Preset input 24 V                        | When ON                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 21.6 to 26.4 V                   | 2 to 5 mA                            |
|                    |                  |                     |     |                                          | When OFF                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 5 V or less                      | 0.1 mA or less                       |
|                    |                  | B18                 | B12 | Preset input 12 V                        | When ON                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 10.8 to 13.2 V                   | 2 to 5 mA                            |
|                    |                  |                     |     |                                          | When OFF                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 4 V or less                      | 0.1 mA or less                       |
|                    |                  | A17                 | A11 | Preset input 5 V                         | When ON                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 2.5 to 5.5 V                     | 2 to 5 mA                            |
|                    |                  |                     |     |                                          | When OFF                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 1 V or less                      | 0.1 mA or less                       |
|                    |                  | B17                 | B11 | PRSTCOM                                  | Response time                                                                                                                                                                                                                                                                                                                                                                                                                                              | OFF → ON<br>0.5 ms or less       | ON → OFF<br>1 ms or less             |
|                    |                  | A16                 | A10 | Function start input 24 V                | When ON                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 21.6 to 26.4 V                   | 2 to 5 mA                            |
|                    |                  |                     |     |                                          | When OFF                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 5 V or less                      | 0.1 mA or less                       |
|                    |                  | B16                 | B10 | Function start input 12 V                | When ON                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 10.8 to 13.2 V                   | 2 to 5 mA                            |
|                    |                  |                     |     |                                          | When OFF                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 4 V or less                      | 0.1 mA or less                       |
|                    |                  | A15                 | A09 | Function start input 5 V                 | When ON                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 2.5 to 5.5 V                     | 2 to 5 mA                            |
|                    |                  |                     |     |                                          | When OFF                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 1 V or less                      | 0.1 mA or less                       |
|                    |                  | B15                 | B09 | FUNCCOM                                  | Response time                                                                                                                                                                                                                                                                                                                                                                                                                                              | OFF → ON<br>0.5 ms or less       | ON → OFF<br>1 ms or less             |
| Output             |                  | A06                 | A05 | EQU1<br>(Coincidence output point No. 1) | Operating voltage 10.2 to 30 V<br>Maximum load current 0.5 A/point, 2 A/common<br>Maximum voltage drop when ON 1.5 V<br>Response time OFF → ON 0.1 ms or less<br>ON → OFF 0.1 ms or less (rated load, resistive load)                                                                                                                                                                                                                                      |                                  |                                      |
|                    |                  | B06                 | B05 | EQU2<br>(Coincidence output point No. 2) |                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                  |                                      |
|                    |                  | B02, B01            |     | 12/24 V                                  | Input voltage 10.2 to 30 V<br>Current consumption 8 mA (TYP 24 V DC)                                                                                                                                                                                                                                                                                                                                                                                       |                                  |                                      |
|                    |                  | A02, A01            |     | 0 V                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                  |                                      |

\* 1: Terminal numbers A08, A07, A03, A04, B08, B07, B04 and B03 are not used.

### 3.6 Encoders that can be Connected

The encoders that can be connected to the QD62(E/D) are described below.

- (1) Encoders that can be connected to the QD62 and QD62E
  - Open collector output type encoders
  - CMOS level voltage output type encoders  
(Verify that the encoder output voltage meets the specifications for the QD62 and QD62E.)
- (2) Encoders that can be connected to the QD62D
  - Line driver output type encoders  
(Verify that the encoder output voltage meets the specifications for the QD62D.)

| POINT                                                                                                                                              |
|----------------------------------------------------------------------------------------------------------------------------------------------------|
| The following encoders cannot be used with the QD62(E/D). <ul style="list-style-type: none"><li>• TTL level voltage output type encoders</li></ul> |

## 4 SETUP AND PROCEDURE BEFORE STARTING THE OPERATION

The following describes the procedure prior to the QD62(E/D) operation, the name and setting of each part of the QD62(E/D), and wiring method.

### 4.1 Handling Precautions

The following are the precautions for handling the QD62(E/D).

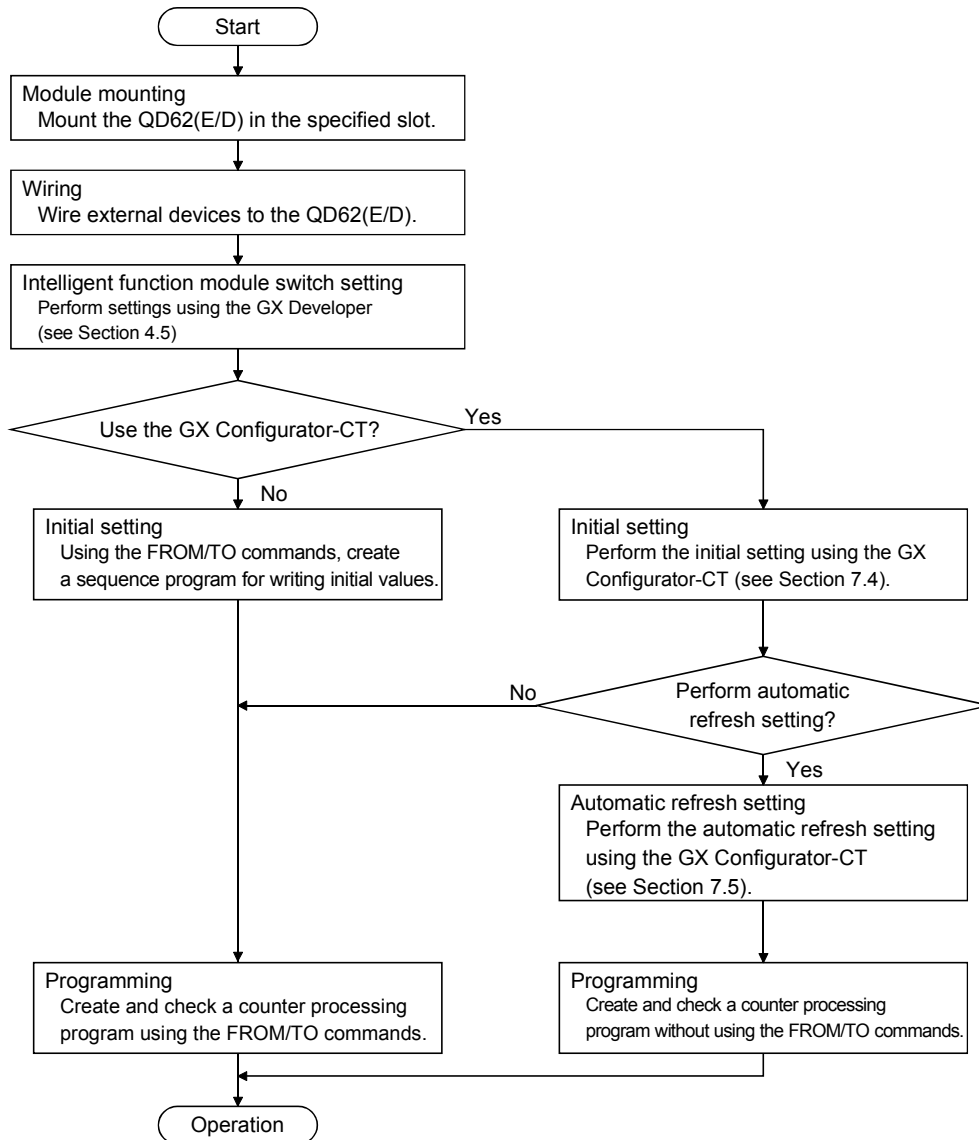
- (1) Do not drop the module casing or connector, or do not subject it to strong impact.
- (2) Do not remove the PCB of each module from its case. Doing so may cause breakdowns.
- (3) Be careful not to let foreign particles such as wire chips get inside the module. These may cause fire, breakdowns and malfunctions.
- (4) The top surface of the module is covered with a protective film to prevent foreign objects such as wire chips from entering the module when wiring. Do not remove this film until the wiring is complete.  
Before operating the system, be sure to remove the film to provide adequate heat ventilation.
- (5) Tighten the mounting screws using torque within the following range.  
If the screws are loose, it may cause the module to fallout, short circuits, or malfunction.  
If the screws are tightened too much, it may cause damage to the screw and/or the module, resulting in fallout, short circuits or malfunction.

| Screw location                     | Clamping torque range |
|------------------------------------|-----------------------|
| Module mounting screws (M3 screws) | 0.36 to 0.48 N · m    |

- (6) To mount the module on the base unit, fully insert the module fixing latch into the fixing hole in the base unit and press the module using the hole as a fulcrum. Improper installation may result in a malfunction or breakdown of the module, or may cause the module to fall off.

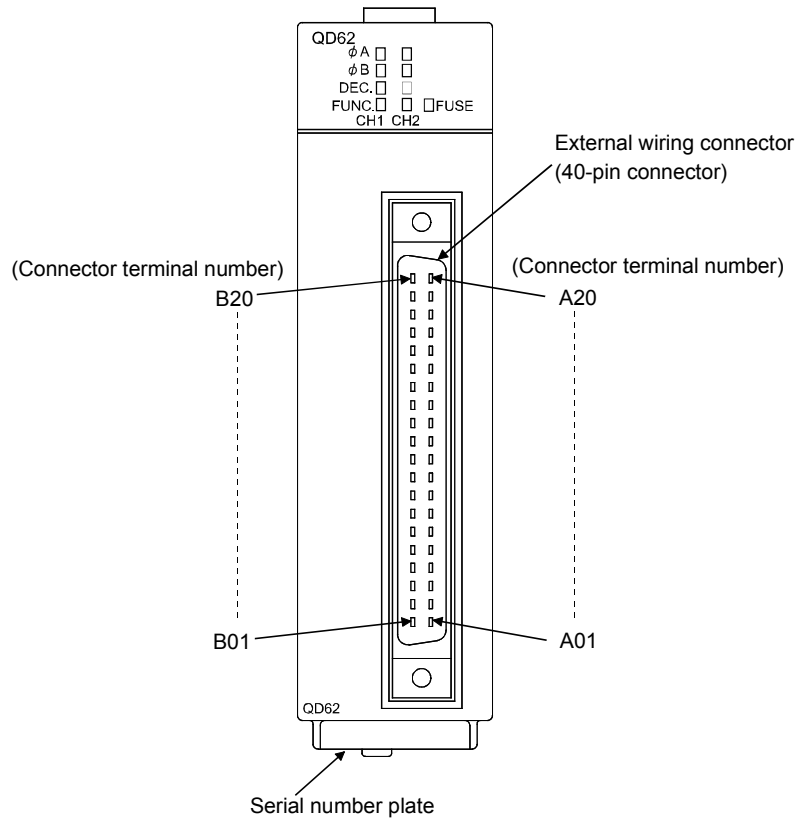
## 4.2 Procedure Before Starting the Operation

The figure below shows the steps that should be followed before starting the QD62(E/D) operation.



## 4.3 Part Identification Nomenclature

The names of the parts used in the QD62(E/D) are shown below:



| LED name | Description                                                                                                                                   |
|----------|-----------------------------------------------------------------------------------------------------------------------------------------------|
| $\phi A$ | Lit : Voltage is being applied to the Phase A pulse input terminal.                                                                           |
| $\phi B$ | Lit : Voltage is being applied to the Phase B pulse input terminal.                                                                           |
| DEC.     | Lit : Counter is in the process of subtraction.                                                                                               |
| FUNC.    | Lit : Voltage is being applied to the function start input terminal.                                                                          |
| FUSE     | Lit : Voltage is being applied to the external power supply input terminal while the fuse in the coincidence signal output section is broken. |

## (1) External wiring Connector

The connectors for use with the QD62(E/D) should be purchased separately by the user.

The connector types are listed below.

## (a) Connector types

| Type                                                     | Model name |
|----------------------------------------------------------|------------|
| Soldering type, straight out                             | A6CON1     |
| Solderless type, straight out                            | A6CON2     |
| Pressure-welding type, straight out                      | A6CON3     |
| Soldering type, usable for straight out and diagonal out | A6CON4     |

## 4.4 Wiring

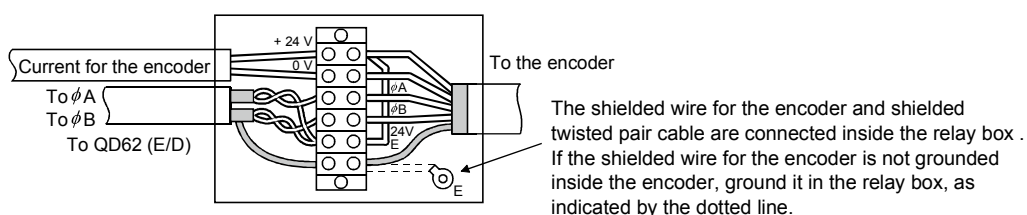
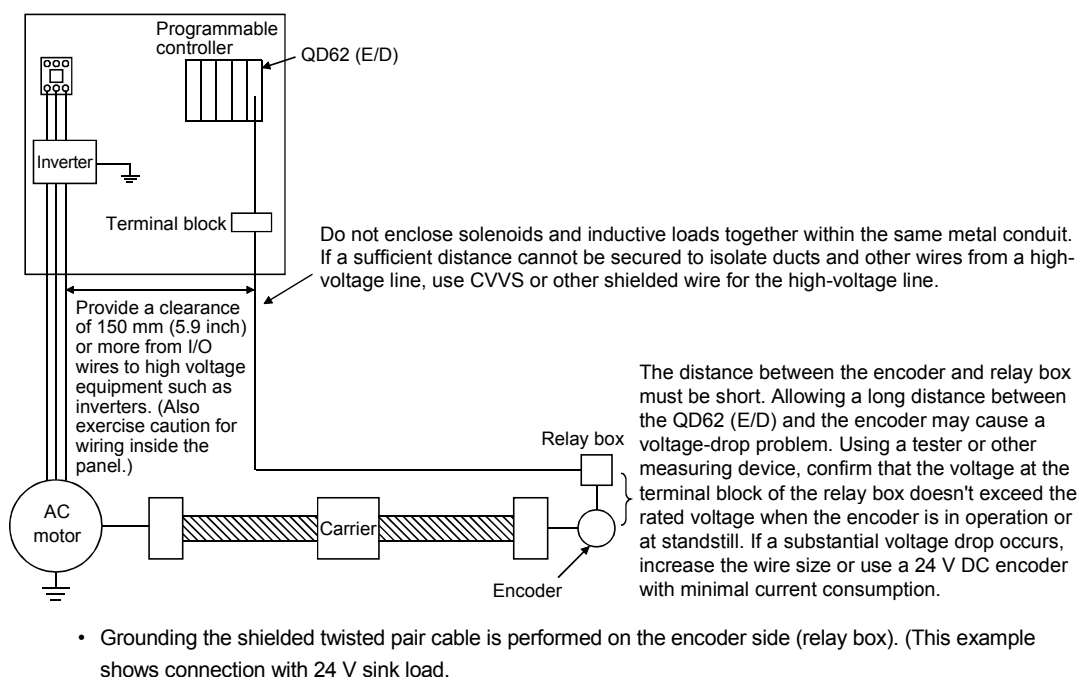
The following explains how to wire the encoder and the controller to the QD62(E/D).

### 4.4.1 Wiring precautions

In order to fully utilise the functions of the QD62(E/D) and ensure system reliability, external wiring having a minimum of noise effect must be provided.

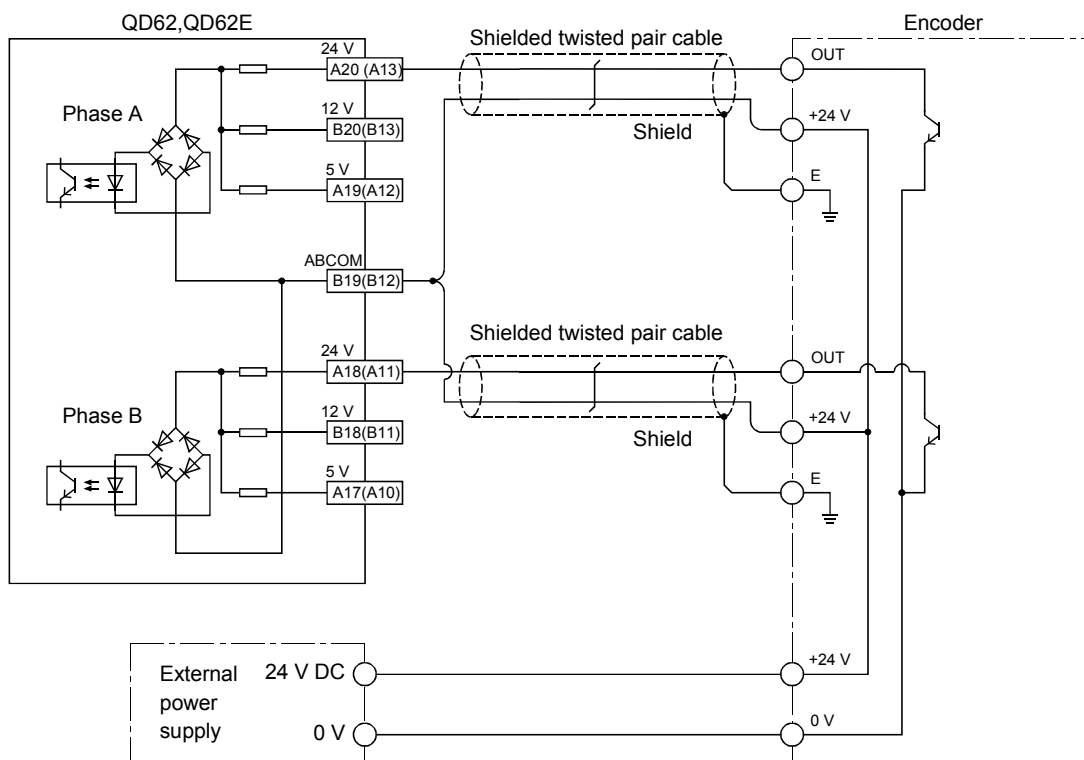
The precautions regarding external wiring are described below.

- (1) Different terminals have been prepared for connection depending on the voltage of the input signal. Connecting a terminal of incorrect voltage may result in malfunction or mechanical failure.
- (2) For 1-phase input, always perform pulse input wiring on the Phase A side.
- (3) When pulse status noise is input, the QD62(E/D) may miscount.
- (4) Provide the following measures against noise for high-speed pulse input:
  - (a) Always use a shielded twisted pair cable and provide grounding.
  - (b) Avoid placing the shielded twisted pair cables or input/output cables. Place the cable at least 150 mm (5.9 inch) from such wires and perform wiring using the least distance as possible.
- (5) An example of wiring incorporating measures against noise is shown below:



## 4.4.2 Wiring example of a module and an encoder

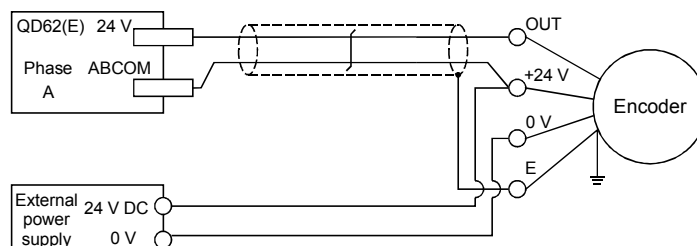
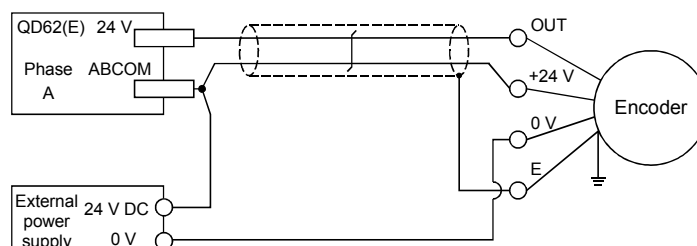
## (1) Wiring example with an open collector output type encoder (24 V DC)



The number inside the ( ) indicates the terminal number for channel 2.

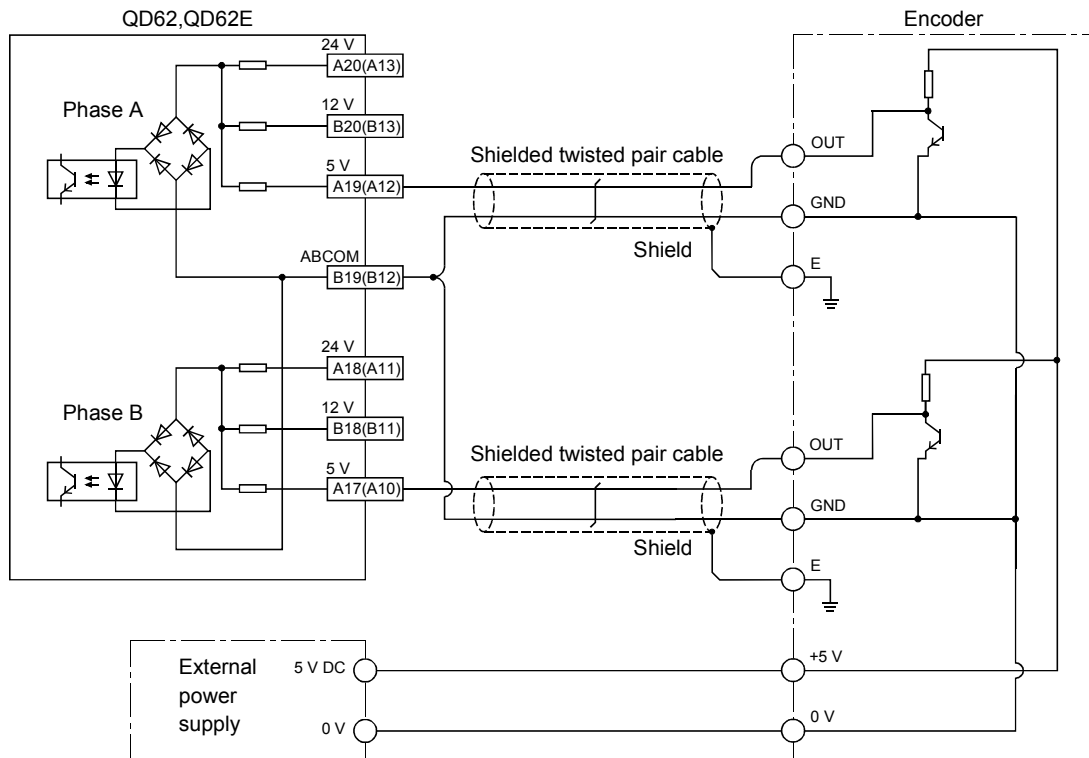
**POINT**

When wiring the QD62, QD62E, and the encoder, separate the power supply cable and signal cable. The following diagram shows an example.

**[Wiring example]****[Incorrect wiring example]**

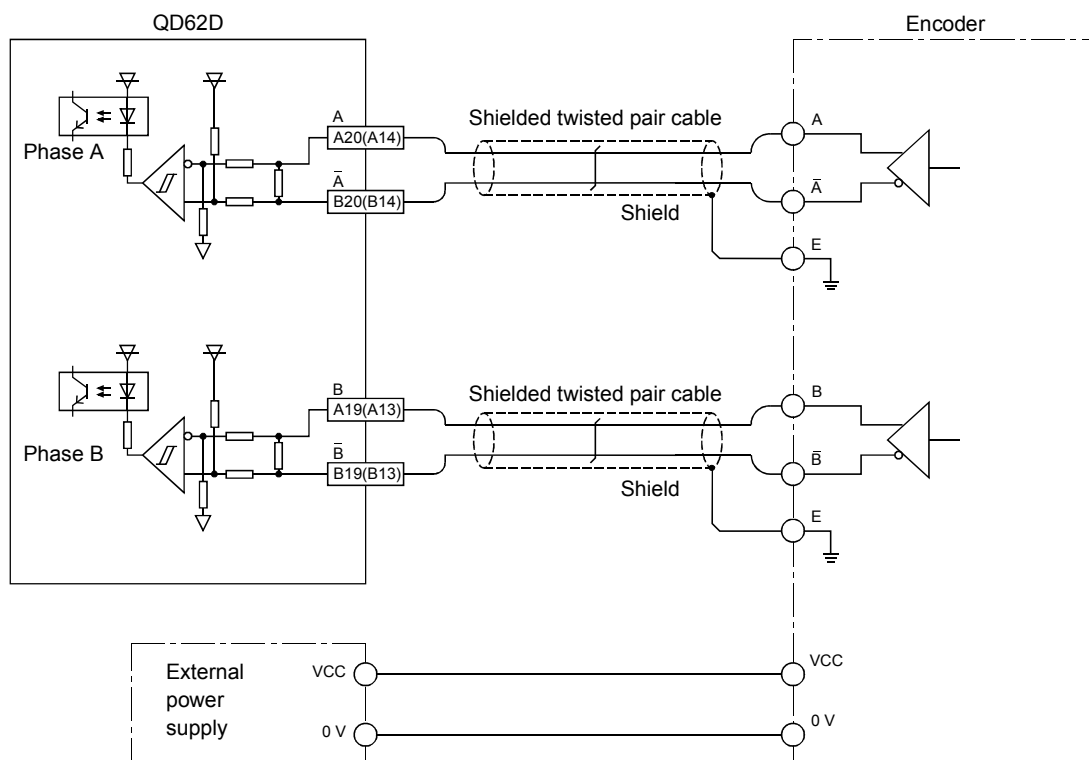
The current flows through the shielded twisted pair cables in the same direction, so there is no cancelling effect. This makes it more prone to electromagnetic induction.

## (2) Wiring example with a voltage output type encoder (5 V DC)



The number inside the ( ) indicates the terminal number for channel 2.

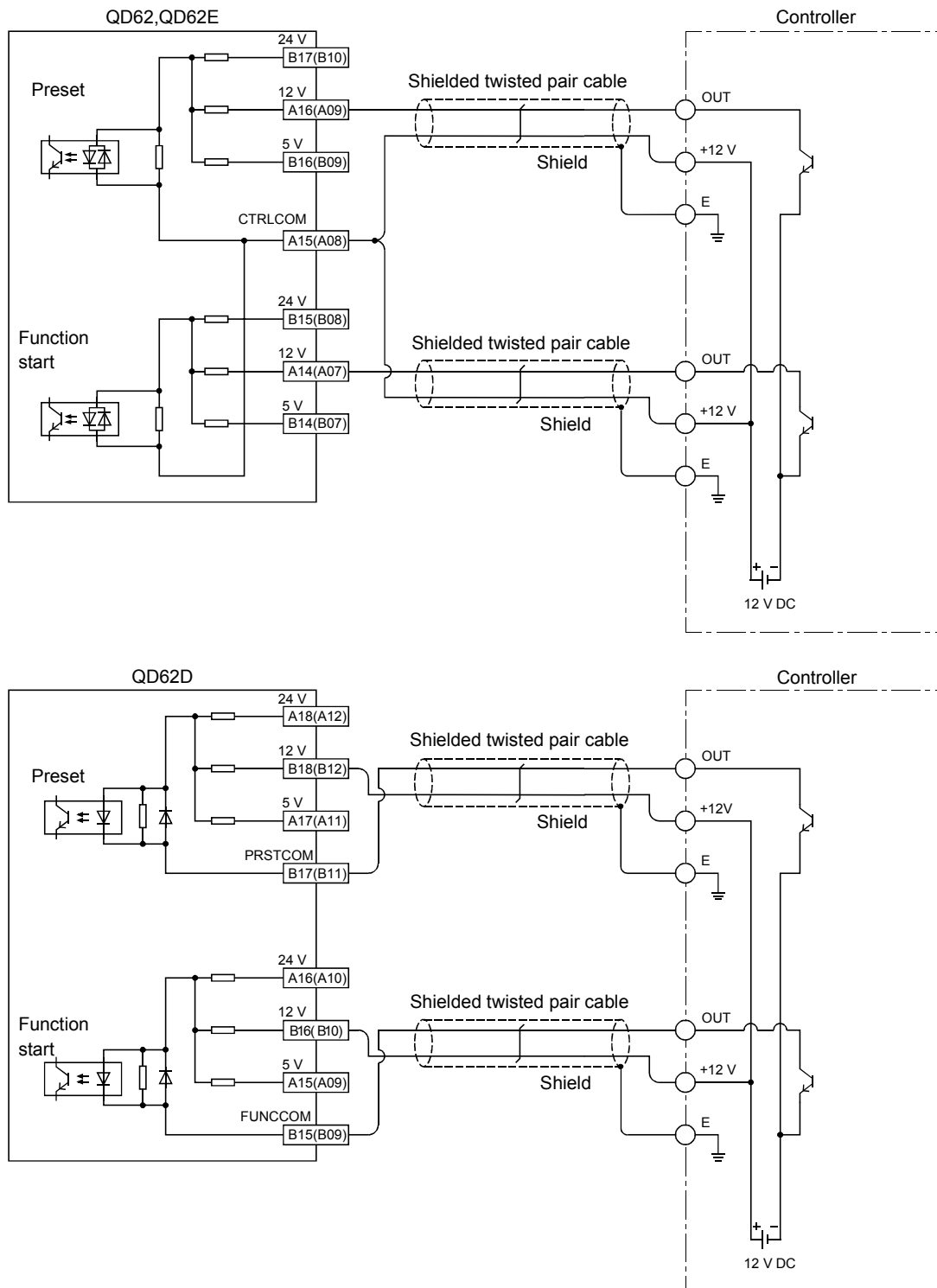
### (3) Wiring example with a driver (equivalent to Am26LS31) encoder



The number inside the ( ) indicates the terminal number for channel 2.

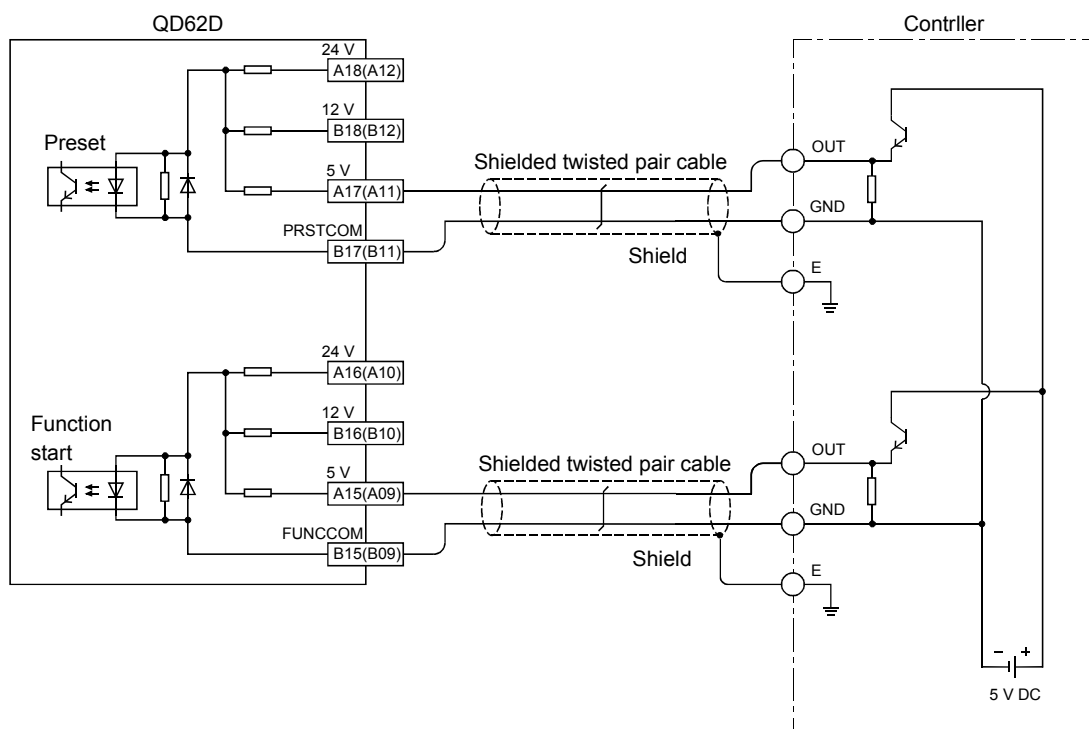
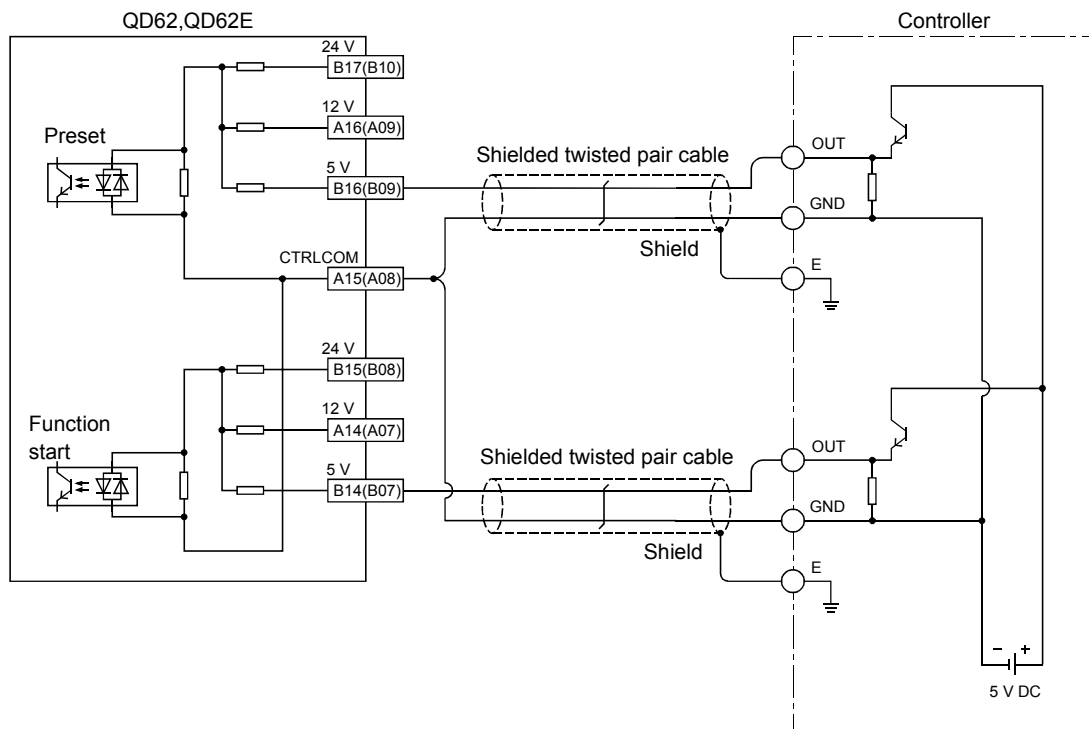
## 4.4.3 Wiring example of a controller and an external input terminal

(1) When the controller (sink loading type) is 12 V DC



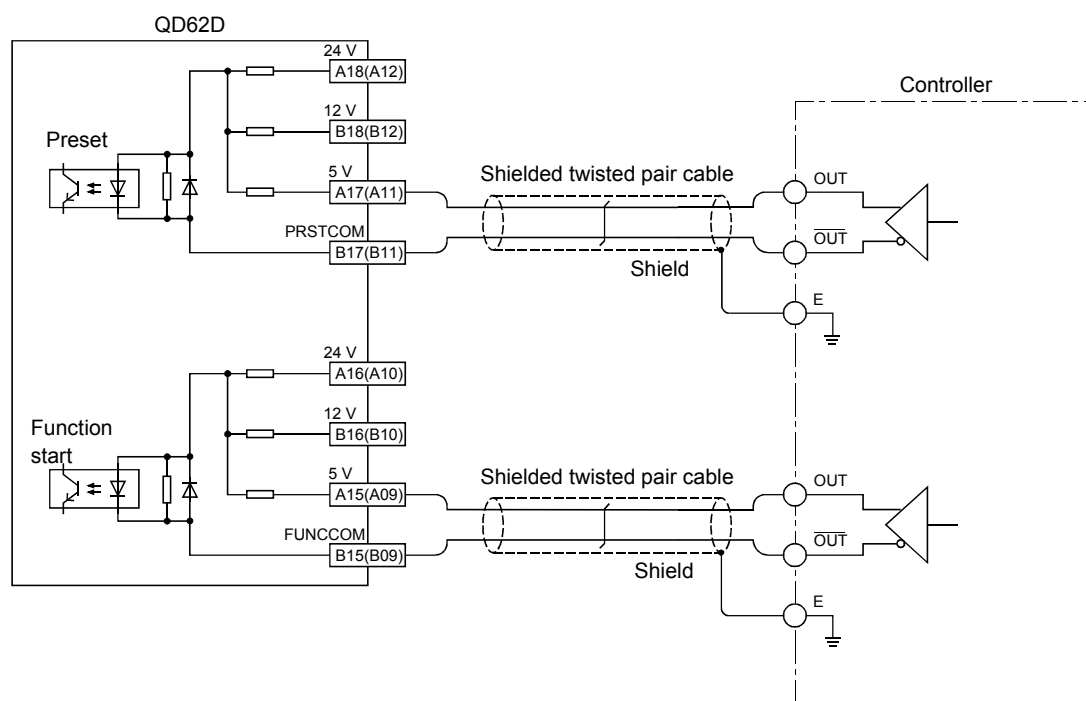
The number inside the ( ) indicates the terminal number for channel 2.

## (2) When the controller (source loading type) is 5 V DC



The number inside the ( ) indicates the terminal number for channel 2.

## (3) When the controller is a line driver

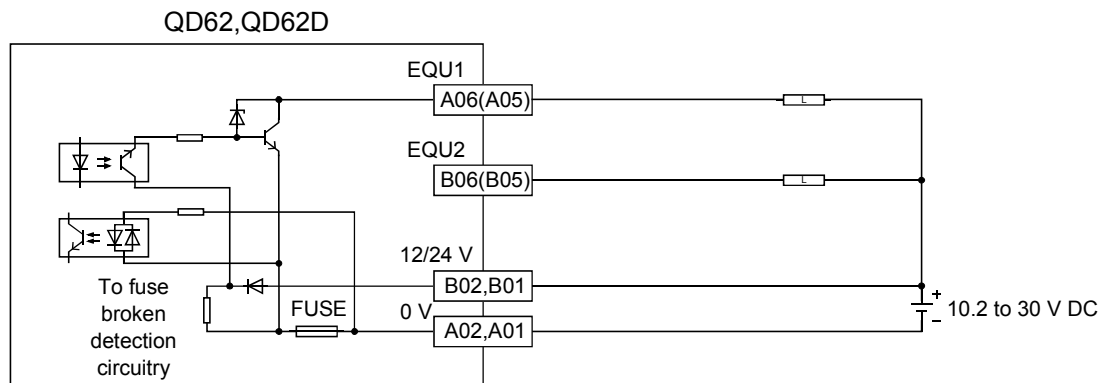


The number inside the ( ) indicates the terminal number for channel 2.

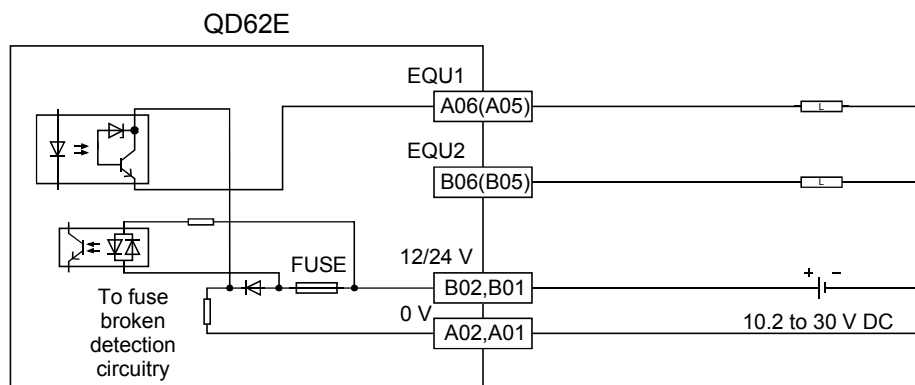
## 4.4.4 Wiring example with an external output

When the coincidence output (EQU terminal) is used, an external power supply of 10.2 to 30 V DC will be required for operation of the internal photocopy. A wiring example is shown below.

## (1) For QD62, QD62D (Sink output type)



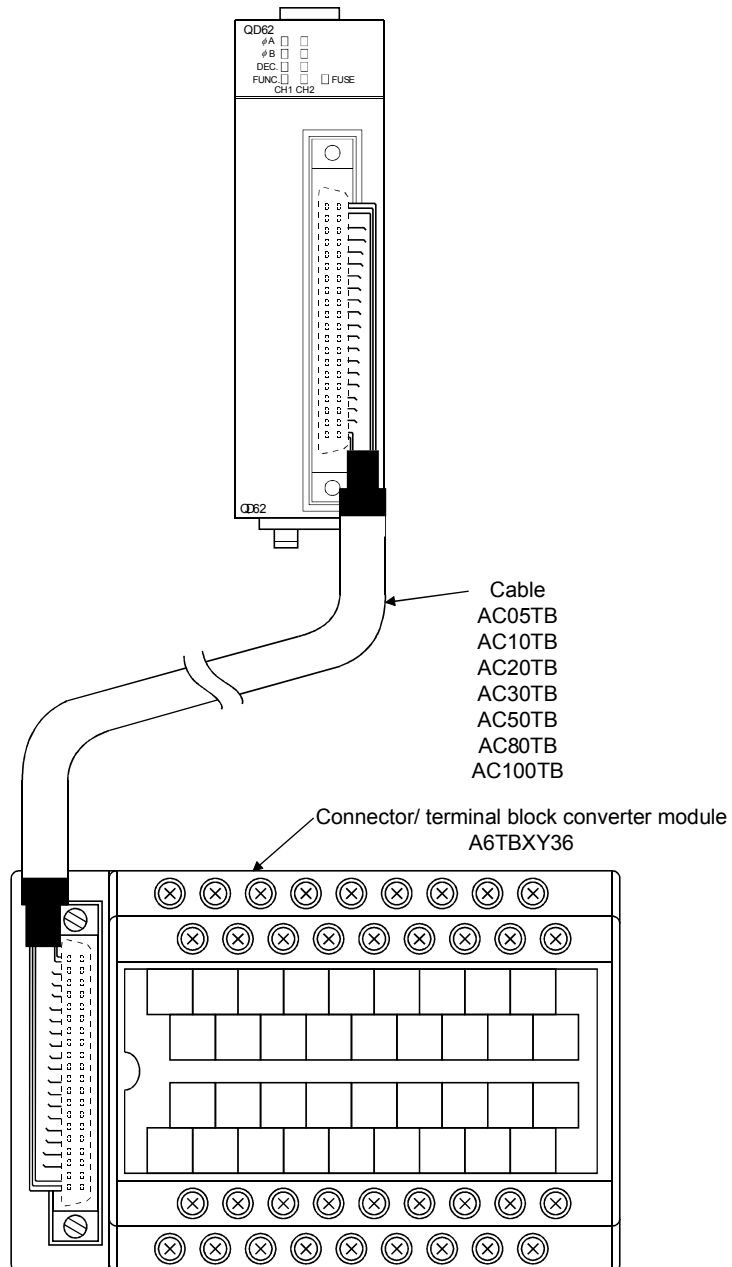
## (2) For QD62E (Source output type)



The number inside the ( ) indicates the terminal number for channel 2.

## 4.4.5 Using the connector/terminal block converter module

- (1) The figure below shows the wiring when a connector/terminal block converter module and a cable are used in the QD62 (E/D).



- (2) The following table lists the signal names and the corresponding connector side terminal numbers and terminal block side terminal symbols, when a connector/terminal block converter module is used in the QD62(E/D) .

For the QD62 and QD62E

|         | Signal name                              | Connector side terminal number | Terminal block side terminal symbol |
|---------|------------------------------------------|--------------------------------|-------------------------------------|
| CH1     | Phase A pulse input 24 V                 | A20                            | 10                                  |
|         | Phase A pulse input 12 V                 | B20                            | 0                                   |
|         | Phase A pulse input 5 V                  | A19                            | 11                                  |
|         | ABCOM                                    | B19                            | 1                                   |
|         | Phase B pulse input 24 V                 | A18                            | 12                                  |
|         | Phase B pulse input 12 V                 | B18                            | 2                                   |
|         | Phase B pulse input 5 V                  | A17                            | 13                                  |
|         | Preset input 24 V                        | B17                            | 3                                   |
|         | Preset input 12 V                        | A16                            | 14                                  |
|         | Preset input 5 V                         | B16                            | 4                                   |
|         | CTRLCOM                                  | A15                            | 15                                  |
|         | Function start input 24 V                | B15                            | 5                                   |
|         | Function start input 12 V                | A14                            | 16                                  |
|         | Function start input 5 V                 | B14                            | 6                                   |
|         | EQU1<br>(Coincidence output point No. 1) | A06                            | 1E                                  |
|         | EQU2<br>(Coincidence output point No. 2) | B06                            | E                                   |
| CH2     | Phase A pulse input 24 V                 | A13                            | 17                                  |
|         | Phase A pulse input 12 V                 | B13                            | 7                                   |
|         | Phase A pulse input 5 V                  | A12                            | 18                                  |
|         | ABCOM                                    | B12                            | 8                                   |
|         | Phase B pulse input 24 V                 | A11                            | 19                                  |
|         | Phase B pulse input 12 V                 | B11                            | 9                                   |
|         | Phase B pulse input 5 V                  | A10                            | 1A                                  |
|         | Preset input 24 V                        | B10                            | A                                   |
|         | Preset input 12 V                        | A09                            | 1B                                  |
|         | Preset input 5 V                         | B09                            | B                                   |
|         | CTRLCOM                                  | A08                            | 1C                                  |
|         | Function start input 24 V                | B08                            | C                                   |
|         | Function start input 12 V                | A07                            | 1D                                  |
|         | Function start input 5 V                 | B07                            | D                                   |
|         | EQU1<br>(Coincidence output point No. 1) | A05                            | 1F                                  |
|         | EQU2<br>(Coincidence output point No. 2) | B05                            | F                                   |
| 12/24 V |                                          | B02<br>B01                     | 24 V                                |
| 0 V     |                                          | A02<br>A01                     | 0 V                                 |

For the QD62D

|         | Signal name                              | Connector side terminal number | Terminal block side terminal symbol |
|---------|------------------------------------------|--------------------------------|-------------------------------------|
| CH1     | Phase A pulse input (+)                  | A20                            | 10                                  |
|         | Phase A pulse input (–)                  | B20                            | 0                                   |
|         | Phase B pulse input (+)                  | A19                            | 11                                  |
|         | Phase B pulse input (–)                  | B19                            | 1                                   |
|         | Preset input 24 V                        | A18                            | 12                                  |
|         | Preset input 12 V                        | B18                            | 2                                   |
|         | Preset input 5 V                         | A17                            | 13                                  |
|         | PRSTCOM                                  | B17                            | 3                                   |
|         | Function start input 24 V                | A16                            | 14                                  |
|         | Function start input 12 V                | B16                            | 4                                   |
|         | Function start input 5 V                 | A15                            | 15                                  |
|         | FUNCCOM                                  | B15                            | 5                                   |
|         | EQU1<br>(Coincidence output point No. 1) | A06                            | 1E                                  |
|         | EQU2<br>(Coincidence output point No. 2) | B06                            | E                                   |
| CH2     | Phase A pulse input (+)                  | A14                            | 16                                  |
|         | Phase A pulse input (–)                  | B14                            | 6                                   |
|         | Phase B pulse input (+)                  | A13                            | 17                                  |
|         | Phase B pulse input (–)                  | B13                            | 7                                   |
|         | Preset input 24 V                        | A12                            | 18                                  |
|         | Preset input 12 V                        | B12                            | 8                                   |
|         | Preset input 5 V                         | A11                            | 19                                  |
|         | PRSTCOM                                  | B11                            | 9                                   |
|         | Function start input 24 V                | A10                            | 1A                                  |
|         | Function start input 12 V                | B10                            | A                                   |
|         | Function start input 5 V                 | A09                            | 1B                                  |
|         | FUNCCOM                                  | B09                            | B                                   |
|         | EQU1<br>(Coincidence output point No. 1) | A05                            | 1F                                  |
|         | EQU2<br>(Coincidence output point No. 2) | B05                            | F                                   |
| 12/24 V |                                          | B02<br>B01                     | 24 V                                |
| 0 V     |                                          | A02<br>A01                     | 0 V                                 |

**REMARK**

If a connector/terminal block converter module is used in the QD62D, the terminals on the terminal block side with symbols, C, D, 1C and 1D are not used.

## 4.5 Switch Settings for the Intelligent Function Module

This section explains the switch settings for the intelligent function module. These switch settings are performed with the GX Developer I/O assignments.

## (1) Switch setting for the intelligent function module

Five switches (switch numbers 1 to 5) are available for the intelligent function module and they are set with 16 bit data.

If the switches for the intelligent function module are not set, the default value of 0 is used for switches 1 to 5.

|                             | Data item                                                                                                                                                                                                                                                                                                                                                                                 |
|-----------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Switch 1<br>(for channel 1) | <p>Pulse input mode</p> <p>0: 1-phase multiple of 1<br/>1: 1-phase multiple of 2<br/>2: CW/CCW<br/>3: 2-phase multiple of 1<br/>4: 2-phase multiple of 2<br/>5: 2-phase multiple of 4</p> <p>Counting speed setting</p> <p>0: 10 k PPS<br/>1: 100 k PPS<br/>2: 200 k PPS<br/>3: 500 k PPS<br/>(Only for the QD62D)</p> <p>Counter format</p> <p>0: Linear counter<br/>1: Ring counter</p> |
| Switch 2<br>(for channel 2) |                                                                                                                                                                                                                                                                                                                                                                                           |
| Switch 3                    |                                                                                                                                                                                                                                                                                                                                                                                           |
| Switch 4                    | Reserved                                                                                                                                                                                                                                                                                                                                                                                  |
| Switch 5                    | Reserved                                                                                                                                                                                                                                                                                                                                                                                  |

(Example) Target channel: Channel 2;

Pulse input mode setting: 2 phase multiple of 1; Counting speed setting: 200 k PPS; Counter format: Ring counter

Set as switch 2 = 0123H

| POINT                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>The counting speed setting of 500kPPS can only be used with the QD62D. Setting the counting speed to 500k PPS for the QD62 and QD62E may cause miscounts. Thus, do not use this setting for the QD62 and QD62E.</p> <p>The reserved switches in the intelligent function module switch setting items are for system use, not for users. Therefore, always fix them to 0. If used (changed from 0 to 1) by a user, the operations of the QD62(E/D) are not ensured.</p> |

## (2) Details of the intelligent function module switch setting

| Data item              | Description                                | Reference                       |
|------------------------|--------------------------------------------|---------------------------------|
| Pulse input mode       | Set the pulse input mode for each channel. | Section 5.5.1                   |
| Counting speed setting | Set the counting speed for each channel.   | Section 3.1                     |
| Counter format         | Set the counter format for each channel.   | Section 5.2.1,<br>Section 5.2.2 |

## (3) Detailed settings

The error time output mode and H/W error time PLC operation mode are set in the detailed settings for the intelligent function module.

## (a) Error time output mode

Sets to either clear or hold the module output status when a programmable controller CPU stop error occurs.

- Clear : Turns OFF all of the coincidence signal external outputs.
- Hold : Holds the same ON/OFF status before the CPU is stopped for the coincidence signal external outputs.

## (b) H/W error time PLC operating mode

Sets to either stop or continue the programmable controller CPU operation for each module when an intelligent function module error (SP.UNIT DOWN) is detected.

- Stop : Programmable controller CPU stops operation.
- Continue : Programmable controller CPU continues the execution of the programs for modules other than those in which an error was detected.

An intelligent function module error in the QD62(E/D) is detected when the Unit READY flag is not in the READY state due to a module hardware failure.

# (4) Operating procedure

Perform settings, starting with the GX Developer I/O assignment screen.

**I/O parameter setting**

PLC name | PLC system | PLC file | PLC RAS(1) | PLC RAS(2) | Device | Program | Boot file | SFC | I/O assignment

**I/O Assignment(\*)**

| Slot | Type    | Model name | Points   | StartXY |
|------|---------|------------|----------|---------|
| 0    | PLC     |            |          |         |
| 1    | Intelli | QD62       | 16points | 0000    |
| 2    |         |            |          |         |
| 3    |         |            |          |         |
| 4    |         |            |          |         |
| 5    |         |            |          |         |
| 6    |         |            |          |         |
| 7    |         |            |          |         |

Assigning the I/O address is not necessary as the CPU does it automatically.  
Leaving this setting blank will not cause an error to occur.

**Base setting(\*)**

| Base model name | Power model name | Extension cable | Slots |
|-----------------|------------------|-----------------|-------|
| Main            |                  |                 |       |
| Ext.Base1       |                  |                 |       |
| Ext.Base2       |                  |                 |       |
| Ext.Base3       |                  |                 |       |
| Ext.Base4       |                  |                 |       |
| Ext.Base5       |                  |                 |       |
| Ext.Base6       |                  |                 |       |
| Ext.Base7       |                  |                 |       |

Base mode:  
☐ Auto  
☐ Detail

8 Slot Default  
12 Slot Default

(\*)Settings should be set as same when using multiple CPU.

Import Multiple CPU Parameter | Read PLC data

Acknowledge XY assignment | Multiple CPU settings | Default | Check | End | Cancel

## (a) I/O assignment screen

Specify the following for the slot where the QD62(E/D) is mounted.

- Type : Select "Intelli."
- Model name : Enter the module's model name.
- Points : Select 16 points.
- Start XY : Enter the start I/O signal for the QD62(E/D).

**Switch setting for I/O and intelligent function module**

Input format: HEX

| Slot | Type    | Model name | Switch 1 | Switch 2 | Switch 3 | Switch 4 | Switch 5 |
|------|---------|------------|----------|----------|----------|----------|----------|
| 0    | PLC     |            |          |          |          |          |          |
| 1    | Intelli | QD62       | 0123     |          |          |          |          |
| 2    |         |            |          |          |          |          |          |
| 3    |         |            |          |          |          |          |          |
| 4    |         |            |          |          |          |          |          |
| 5    |         |            |          |          |          |          |          |
| 6    |         |            |          |          |          |          |          |
| 7    |         |            |          |          |          |          |          |
| 8    |         |            |          |          |          |          |          |
| 9    |         |            |          |          |          |          |          |
| 10   |         |            |          |          |          |          |          |
| 11   |         |            |          |          |          |          |          |
| 12   |         |            |          |          |          |          |          |
| 13   |         |            |          |          |          |          |          |
| 14   |         |            |          |          |          |          |          |
| 15   |         |            |          |          |          |          |          |

End | Cancel

## (b) Switch setting for I/O and intelligent function module

Click on **Switch Setting** on the I/O assignment screen to display the screen at left and set switches 1 to 5. The setting can easily be done if values are entered in hexadecimal. Change the input format to hexadecimal and enter values.

**Intelligent function module detailed setting**

| Slot | Type    | Model name | Error time output mode | H/W error time PLC operation mode | I/O response time | Control PLC (*) |
|------|---------|------------|------------------------|-----------------------------------|-------------------|-----------------|
| 0    | PLC     |            |                        |                                   |                   |                 |
| 1    | Intelli | QD62       | Hold                   | Stop                              |                   |                 |
| 2    |         |            |                        |                                   |                   |                 |
| 3    |         |            |                        |                                   |                   |                 |
| 4    |         |            |                        |                                   |                   |                 |
| 5    |         |            |                        |                                   |                   |                 |
| 6    |         |            |                        |                                   |                   |                 |
| 7    |         |            |                        |                                   |                   |                 |
| 8    |         |            |                        |                                   |                   |                 |
| 9    |         |            |                        |                                   |                   |                 |
| 10   |         |            |                        |                                   |                   |                 |
| 11   |         |            |                        |                                   |                   |                 |
| 12   |         |            |                        |                                   |                   |                 |
| 13   |         |            |                        |                                   |                   |                 |
| 14   |         |            |                        |                                   |                   |                 |
| 15   |         |            |                        |                                   |                   |                 |

(\*)settings should be set as same when using multiple PLC.

End | Cancel

## (c) Intelligent function module detailed setting

Click on **Detailed Setting** on the I/O assignment screen to display the screen at left, and then set the error time output mode and H/W error time PLC operation mode.

## 5 BASIC USAGE

This section explains the basic usage of the QD62(E/D).

## 5.1 Pulse Input and Counting Method

## 5.1.1 Types of pulse input methods

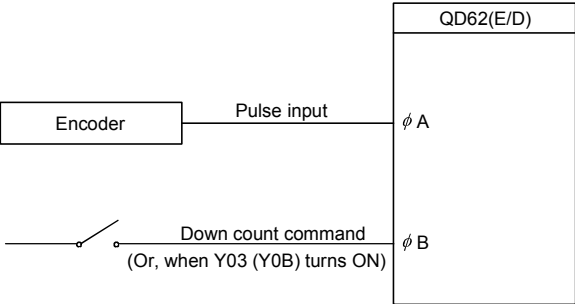
Six types of the pulse input methods are available. These include 1 phase multiple of 1, 1 phase multiple of 2, CW/CCW pulse input, 2 phase multiple of 1, 2 phase multiple of 2, and 2 phase multiple of 4. The following table shows the pulse input methods and count timings.

| Pulse input method    | Count timing          |  |                                                                                                                                                                                                                                                        |
|-----------------------|-----------------------|--|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1-phase multiple of 1 | For addition count    |  | Count at $\phi A$ rise ( $\uparrow$ )<br>$\phi B$ and Y03 (Y0B) are OFF                                                                                                                                                                                |
|                       | For subtraction count |  | Count at $\phi A$ fall ( $\downarrow$ )<br>$\phi B$ or Y03 (Y0B) is ON                                                                                                                                                                                 |
| 1-phase multiple of 2 | For addition count    |  | Count at $\phi A$ rise ( $\uparrow$ ) and fall ( $\downarrow$ )<br>$\phi B$ and Y03 (Y0B) are OFF                                                                                                                                                      |
|                       | For subtraction count |  | Count at $\phi A$ rise ( $\uparrow$ ) and fall ( $\downarrow$ )<br>$\phi B$ or Y03 (Y0B) is ON                                                                                                                                                         |
| CW/CCW                | For addition count    |  | Count at $\phi A$ rise ( $\uparrow$ )<br>$\phi B$ is OFF                                                                                                                                                                                               |
|                       | For subtraction count |  | $\phi A$ is OFF<br>Count at $\phi B$ rise ( $\uparrow$ )                                                                                                                                                                                               |
| 2-phase multiple of 1 | For addition count    |  | Count at $\phi A$ rise ( $\uparrow$ ) when $\phi B$ is OFF                                                                                                                                                                                             |
|                       | For subtraction count |  | Count at $\phi A$ fall ( $\downarrow$ ) when $\phi B$ is OFF                                                                                                                                                                                           |
| 2-phase multiple of 2 | For addition count    |  | Count at $\phi A$ rise ( $\uparrow$ ) when $\phi B$ is OFF<br>Count at $\phi A$ fall ( $\downarrow$ ) when $\phi B$ is ON                                                                                                                              |
|                       | For subtraction count |  | Count at $\phi A$ rise ( $\uparrow$ ) when $\phi B$ is ON<br>Count at $\phi A$ fall ( $\downarrow$ ) when $\phi B$ is OFF                                                                                                                              |
| 2-phase multiple of 4 | For addition count    |  | Count at $\phi A$ rise ( $\uparrow$ ) when $\phi B$ is OFF<br>Count at $\phi A$ fall ( $\downarrow$ ) when $\phi B$ is ON<br>Count at $\phi B$ rise ( $\uparrow$ ) when $\phi A$ is OFF<br>Count at $\phi B$ fall ( $\downarrow$ ) when $\phi A$ is ON |
|                       | For subtraction count |  | Count at $\phi A$ rise ( $\uparrow$ ) when $\phi B$ is ON<br>Count at $\phi A$ fall ( $\downarrow$ ) when $\phi B$ is OFF<br>Count at $\phi B$ rise ( $\uparrow$ ) when $\phi A$ is OFF<br>Count at $\phi B$ fall ( $\downarrow$ ) when $\phi A$ is ON |

| POINT                                                                                                                                                                                                                                                                                                                              |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| In the case of addition in 1-phase pulse input, make sure that phase B pulse input and the subtraction count command {Y03(Y0B)} are OFF before performing pulse input of phase A.<br>If either of phase B pulse input or the subtraction count command {Y03(Y0B)} is ON, subtraction count is performed in pulse input of phase A. |

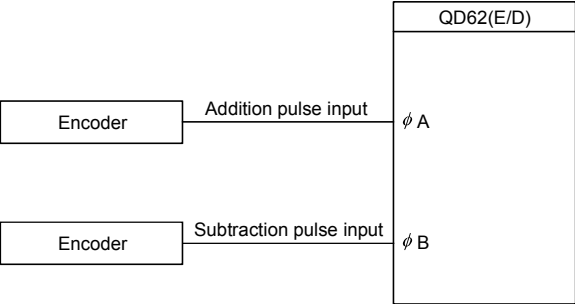
(1) Phase 1 pulse input

For phase 1 pulse input, either a multiple of 1 or multiple of 2 count method can be selected.  
The relationship between the phase A pulse input and the down count command is shown below.



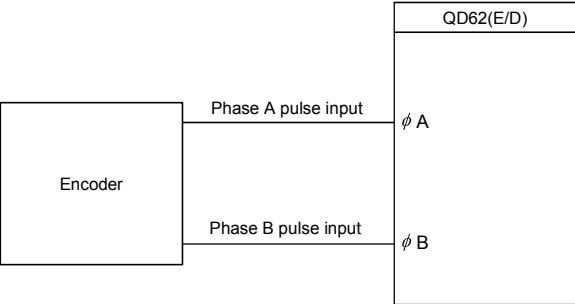
(2) CW/CCW pulse input

For CW/CCW pulse input, the up count is performed when there is a phase A pulse input, and the down count is performed when there is a phase B pulse input. The relationship between the phase A pulse input and phase B pulse input is shown below.



(3) Phase 2 pulse input

For phase 2 pulse input, either a multiple of 1, multiple of 2, or multiple of 4 count method can be selected.  
The phase difference between the phase A pulse and phase B pulse determines whether the up count or down count is performed.  
The relationship between the phase A pulse input and phase B pulse input is shown below.



### 5.1.2 Setting the count method

The count method is set using the GX Developer intelligent function module switch setting.

See Section 4.5 for details on the setting method.

### 5.1.3 Reading the present values

This section explains the methods of reading the present values stored in the buffer memory or the count values when counter function selection is executed.

- (1) When any function is used, the present value is stored into the buffer memory for storing the present value. When the latch counter, sampling counter or periodic pulse counter function is executed, the count value is stored into the buffer memory for storing the counter function selection count value at the addresses shown in the table below, aside from the buffer memory for storing the present value.

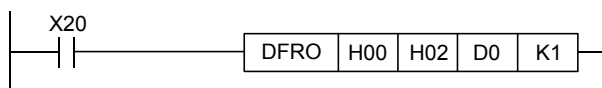
| Description           |     | Present value | Counter function selection count value |                      |                                     |                                    |
|-----------------------|-----|---------------|----------------------------------------|----------------------|-------------------------------------|------------------------------------|
|                       |     |               | Latch count value                      | Sampling count value | Periodic pulse count previous value | Periodic pulse count present value |
| Buffer memory address | CH1 | 2H to 3H      | CH to DH                               | EH to FH             | 10H to 11H                          | 12H to 13H                         |
|                       | CH2 | 22H to 23H    | 2CH to 2DH                             | 2EH to 2FH           | 30H to 31H                          | 32H to 33H                         |

- (2) Both the present values and counter function selection count values are stored in the buffer memory as 32-bit signed binary values. In addition, since the contents of the buffer memory are automatically updated by the count operation, the latest count values can be read from the buffer memory.

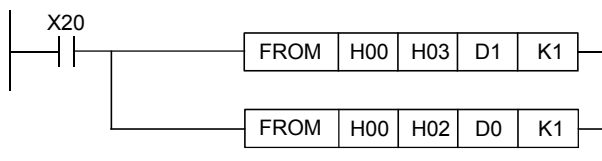
#### POINT

When reading the present values or the counter function selection count values, use the DFRO command and always read values in two-word units. When reading the values in one-word units, if the count values are updated in the middle of read processing, a mismatch may occur between the data contents of the lower and higher words, possibly causing the system to read incorrect count values.

[Program example]



[Example of an undesirable program]



## 5.2 Selecting the Counter Format

Select either linear counter or ring counter with the GX Developer intelligent function module switch setting.

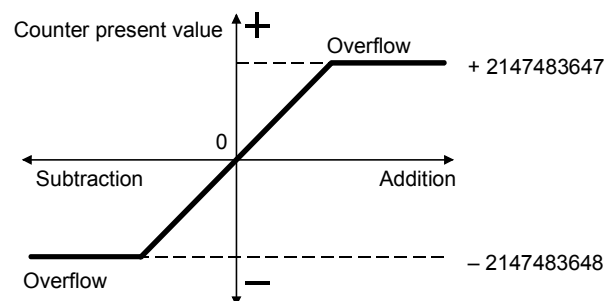
See Section 4.5 for details on the setting method.

### 5.2.1 Selecting the linear counter

#### (1) Linear counter operation

When the linear counter is selected, the count operation is performed between  $-2147483648$  (minimum value) and  $2147483647$  (maximum value).

The linear counter can be used in combination with the preset function and the coincidence output function.



#### (2) Overflow error

- (a) When the counter format is linear counter, an overflow error occurs if the present counter value exceeds  $-2147483648$  (minimum value) during subtraction or exceeds  $2147483647$  (maximum value) during addition.
- (b) When an overflow error occurs, 1 is stored in the buffer memory overflow detection flag (addresses CH1: 8H, CH2: 28H) and the count stops. Even if a pulse is input, the present value will not change from  $-2147483648$  or  $2147483647$ .
- (c) Performing a preset will cancel the overflow error.  
When a preset is performed, 0 is stored in the buffer memory overflow detection flag and the count resumes.
- (d) When an overflow error occurs, a generated module error can be viewed on the system monitor by clicking "Diagnosis" - "System monitor" menu in the GX Developer.

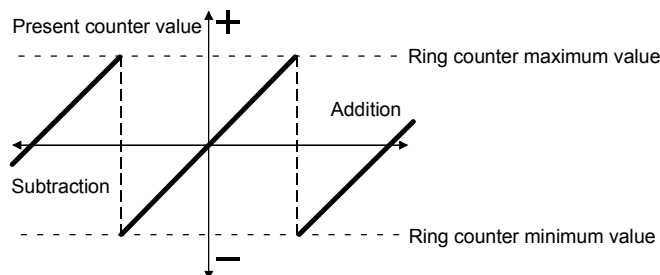
## 5.2.2 Selecting the ring counter

## (1) Ring counter operation

When the ring counter is selected, the count operation is performed repeatedly between the ring counter minimum value (addresses CH1: 14<sub>H</sub> to 15<sub>H</sub>, CH2: 34<sub>H</sub> to 35<sub>H</sub>) and maximum value (addresses CH1: 16<sub>H</sub> to 17<sub>H</sub>, CH2: 36<sub>H</sub> to 37<sub>H</sub>) that were set arbitrarily in the buffer memory.

When the ring counter is being selected, an overflow error does not occur.

The ring counter can be used in combination with the preset function and the coincidence output function.



## (2) Ring counter count range

The count range for the ring counter is determined by the relationship between the present values in the buffer memory (addresses CH1: 2<sub>H</sub> to 3<sub>H</sub>, CH2: 22<sub>H</sub> to 23<sub>H</sub>) at the time the count enable command {Y04 (Y0C)} turns ON or a preset is executed and the ring counter minimum value/maximum value.

Normally the range used is "ring counter minimum value  $\leq$  present value  $\leq$  ring counter maximum value".

- For up count

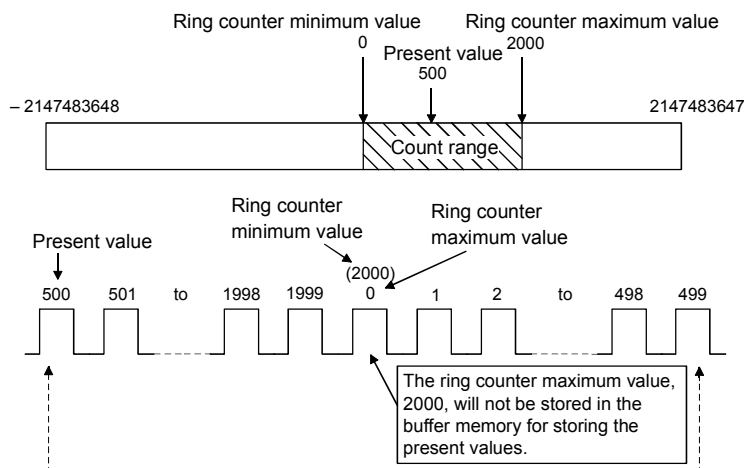
When the present value reaches the ring counter maximum value, the ring counter minimum value is automatically stored as the present value.

- For down count

Even if the present value reaches the ring counter minimum value, the ring counter minimum value will be retained as is. With the next subtraction pulse, (ring counter maximum value  $-1$ ) will be stored as the present value.

Whether during up count or down count, the ring counter maximum value will not be stored in the buffer memory for storing the present values.

For example, if the count is enabled with the ring counter minimum value of 0, the ring counter maximum value of 2000 and the present value of 500, the count range and present value will change as shown in the figure below.



- (a) The ring counter will operate as follows when the "present value < ring counter minimum value" or "ring counter maximum value < present value".

- For up count

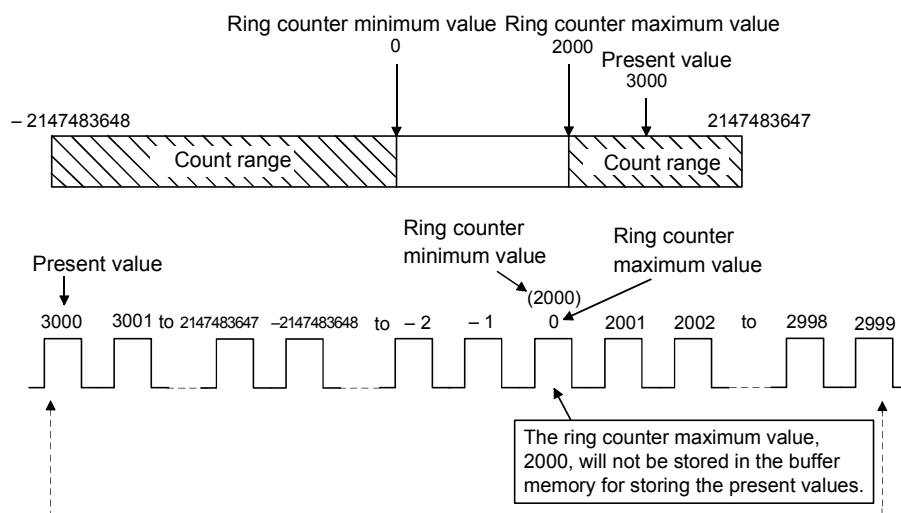
Even if the present value reaches the ring counter minimum value, the ring counter minimum value will be retained as is. With the next addition pulse, (ring counter maximum value + 1) will be stored as the present value.

- For down count

When the present value reaches the ring counter maximum value, the ring counter minimum value is automatically stored as the present value.

Whether during up count or down count, the ring counter maximum value will not be stored in the buffer memory for storing the present values.

For example, if the count is enabled with the ring counter minimum value of 0, the ring counter maximum value of 2000 and the present value of 3000, the count range and present value will change as shown in the figure below.



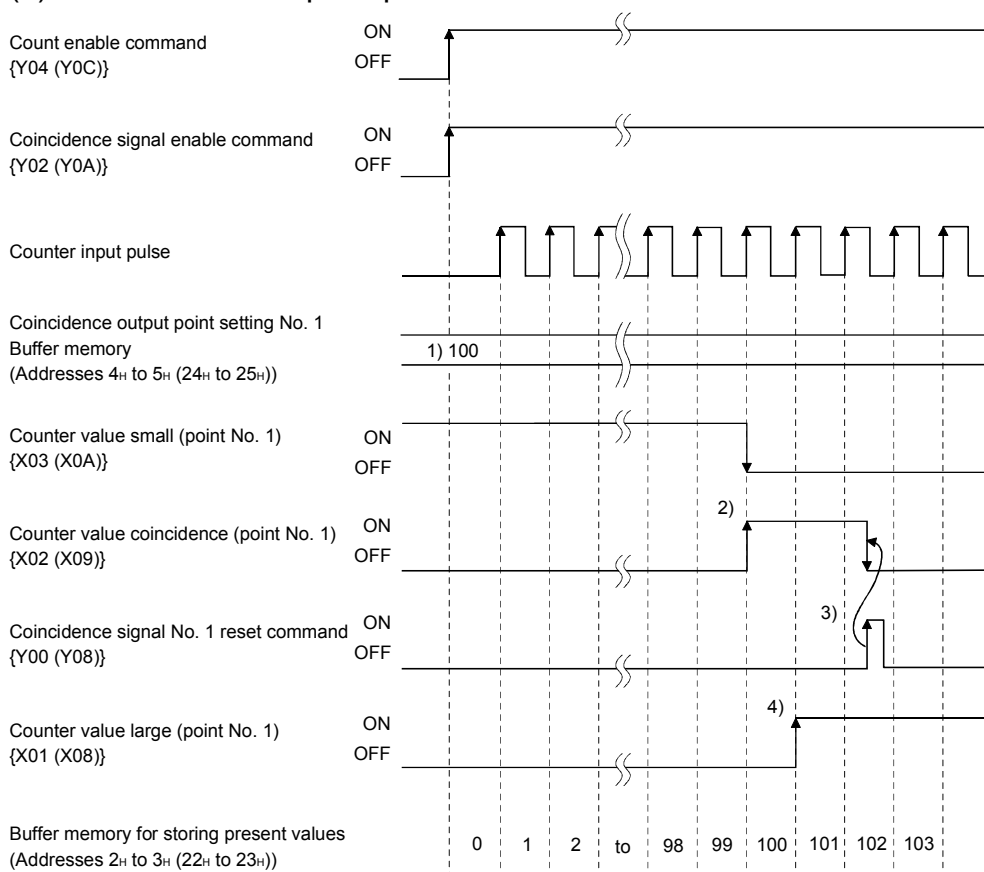
- (b) When the "ring counter's minimum value is equal to the ring counter's maximum value", the count range will cover any value that can be expressed in 32-bit signed binary values (-2147483648 to 2147483647), regardless of the present value.

| POINT                                                                                                                                                                                                                                                                                                   |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| (1) When the count enable command {Y04(Y0C)} is ON, the set values for the buffer memory will not change even if values are written as the minimum value and maximum value of the ring counter. To change the ring counter maximum and minimum value settings, first turn the count enable command OFF. |
| (2) When the count range is to be changed using preset, always change it after first turning the count enable command {Y04(Y0C)} OFF.                                                                                                                                                                   |

### 5.3 Using the Coincidence Output Function

The coincidence output function presets any count value, compares it with the present counter value, and outputs a signal when they match. For the coincidence output, 2 points can be set for each channel. To use the coincidence signal external output, turn ON the coincidence signal enable command {Y02(Y0A)}.

#### (1) Coincidence Output Operation



| Number | Description                                                                                                                                                                                            |
|--------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1)     | The coincidence output point set values are written in advance as 32-bit signed binary values in the coincidence output point No. 1 buffer memory {addresses 4H to 5H (24H to 25H)}.                   |
| 2)     | When the count value becomes the coincidence output point set value, the counter value small signal turns OFF and the counter value coincidence signal turns ON.                                       |
| 3)     | When the coincidence signal reset command is turned ON, the counter value coincidence signal is reset. If the counter value coincidence signal stays ON, the next coincidence signal cannot be output. |
| 4)     | When the counter value becomes greater than the coincidence output point set value, the counter value large signal turns ON.                                                                           |

#### POINT

Before turning ON the coincidence signal enable command, perform the following operations.

- (1) Using any of the following methods, make the coincidence output point setting value and present value different.
  - Changing the coincidence output point setting
  - Changing the present value by preset
  - Inputting a pulse and changing the present value
- (2) Turn OFF, ON, and then OFF again the coincidence signal reset command. If turning ON the coincidence signal enable command before count start or while the coincidence output point setting value and present value are the same, coincidence output is performed.

## (2) Output status setting during a CPU stop error

The output status (clear/hold) can be set for the external output signal when a CPU stop error occurs.

The output status is set using the GX Developer I/O assignment.

See Section 4.5 for details on the I/O assignment setting method.

## (3) Coincidence detection interrupt function

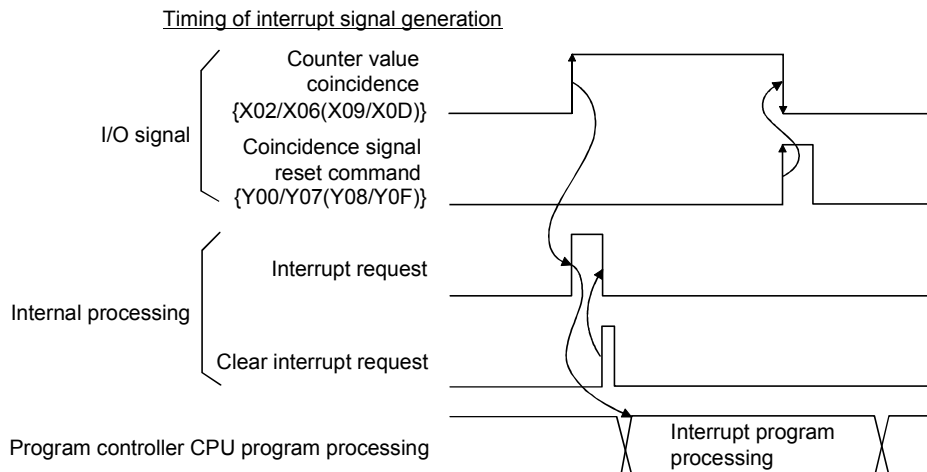
The coincidence detection interrupt function allows making an interrupt request to a programmable controller CPU at the time of coincidence detection to start the interrupt program.

(When the programmable controller CPU is a Q00J/Q00/Q01CPU, use function version B or later.)

(a) With the MELSEC-Q series intelligent function module, each module can have up to 16 points of interruption factors (SI).

The QD62 (E/D) has 4 points of interrupt factors corresponding to the coincidence outputs shown below.

| SI No.  | Interruption factor                                                 |
|---------|---------------------------------------------------------------------|
| 0       | Channel 1: Coincidence detection for coincidence output point No. 1 |
| 1       | Channel 1: Coincidence detection for coincidence output point No. 2 |
| 2       | Channel 2: Coincidence detection for coincidence output point No. 1 |
| 3       | Channel 2: Coincidence detection for coincidence output point No. 2 |
| 4 to 15 | Vacant                                                              |



(b) Select "PLC parameter" - "PLC system" - "Intelligent function module setting" - "Interrupt pointer settings" to set the interrupt factors (SI) of the QD62(E/D) and interrupt pointers of the PLC CPU.

## 1) CPU side [Interrupt pointer start No.]

Set the start interrupt pointer number of the programmable controller CPU.

Setting range: 50 to 255

## 2) PLC side "Interrupt pointer No. of module"

Set the number of interrupt factors (SI).

Setting range: 1 to 4



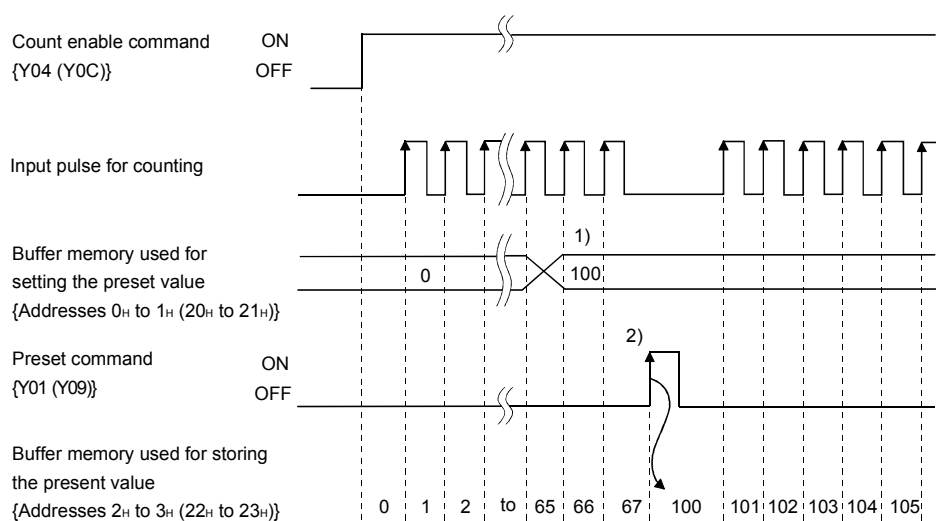
## 5.4 Using the Preset Function

The preset function rewrites the present counter value to any numeric value called the preset value. The preset function can be used when starting the pulse count from the preset value.

The preset function has two preset methods: preset using a sequence program and preset using an external control signal.

### (1) Preset using a sequence program

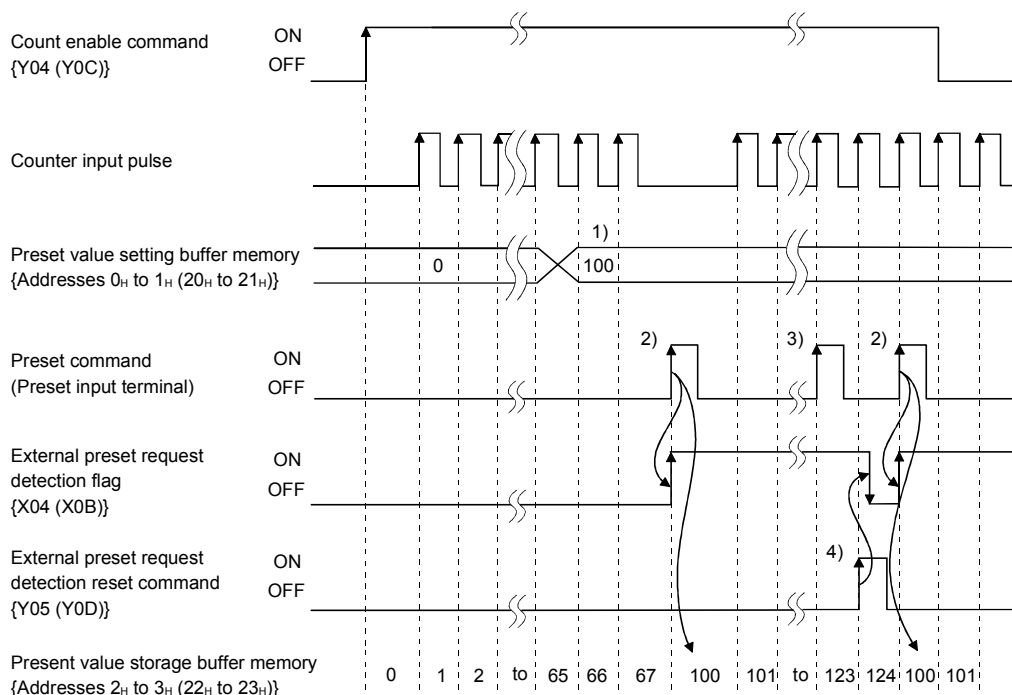
Preset is performed by turning the preset command {Y01(Y09)} ON using the sequence program.



| Number | Description                                                                                                                                                                                                                                                     |
|--------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1)     | Any numeric value is written in 32-bit binary format into the preset value setting buffer memory (Addresses 0 <sub>H</sub> to 1 <sub>H</sub> (20 <sub>H</sub> to 21 <sub>H</sub> )) for the QD62 (E/D).                                                         |
| 2)     | At the start (OFF to ON) of the preset command, the preset value in the preset value setting buffer memory is preset in the present value storage buffer memory. Preset can be executed regardless of whether the count enable command {Y04(Y0C)} is ON or OFF. |

## (2) Preset using an external control signal

Preset is performed by applying ON voltage to the preset input terminal for external input.



| Number | Description                                                                                                                                                                                                                                                                                                    |
|--------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1)     | Any numeric value is written in 32-bit binary format into the preset value setting buffer memory (Addresses 0 <sub>H</sub> to 1 <sub>H</sub> (20 <sub>H</sub> to 21 <sub>H</sub> )) for the QD62(E/D).                                                                                                         |
| 2)     | At the start (OFF to ON) of the preset command (voltage applied to the preset input terminal), the preset value in the preset value setting buffer memory is preset in the present value storage buffer memory. Preset can be executed regardless of whether the count enable command {Y04(Y0C)} is ON or OFF. |

**POINT**

While the external preset request detection flag {X04(X0B)} is ON (3), preset cannot be executed even if voltage is applied to the preset terminal or the preset command {Y01(Y09)} is turned ON. Preset can be performed by turning ON (4) the external preset request detection reset command {Y05(Y0D)} and turning OFF the external preset request detection flag.

## 6 CONVENIENT USAGE

### 6.1 Selecting the Counter Function

By selecting the counter function with the counter function selection setting, the disable count function, latch counter function, sampling counter function and periodic pulse counter function can be used.

The counter function selection can be executed by writing the data shown in the table below into the counter function selection setting buffer memory (address 9<sub>H</sub> (29<sub>H</sub>)) and by using the counter function selection start command (voltage applied to the function start input terminal or turning Y06 (Y0E) ON using the sequence program).

Also, for the counter function selection, only one of the following four functions can be used.

| Counter function selection      | Set value | Remarks                 |
|---------------------------------|-----------|-------------------------|
| Disable count function          | 0         | Initial value (default) |
| Latch counter function          | 1         |                         |
| Sampling counter function       | 2         |                         |
| Periodic pulse counter function | 3         |                         |

#### (1) Disable count function

This function stops the count while the counter function selection start command is being entered when the count enable command (Y04 (Y0C)) is ON.

#### (2) Latch counter function

This function latches the present value at the time the counter function selection start command was entered to the latch count value (addresses C<sub>H</sub> to D<sub>H</sub> (2C<sub>H</sub> to 2D<sub>H</sub>)).

#### (3) Sampling counter function

This function counts the input pulses during the preset sampling period since the time the counter function selection start command was entered.

#### (4) Periodic pulse counter function

This function stores the present value and previous value for each preset periodic time while the counter function selection start command is being entered.

| POINT                                                                                                                                                                                                                                                                                                                                                                                                    |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| (1) Change the counter function while the counter function selection start command is OFF.                                                                                                                                                                                                                                                                                                               |
| (2) The counter function selection can be executed either by turning Y06 (Y0E) ON or applying voltage to the function start input terminal. Also, the signal that was entered first takes precedence.                                                                                                                                                                                                    |
| (3) Time settings for the sampling counter function and the periodic pulse counter function are performed by writing data in a range from 1 to 65535 into the sampling/periodic setting buffer memory {address A <sub>H</sub> (2A <sub>H</sub> )}. The time unit is 10 ms.<br>(Example) When 420 is specified in the sampling/periodic time setting buffer memory<br>Setting time = 420 × 10 = 4200 [ms] |

## 6.1.1 Reading the counter function selection count value

The counter function selection count values are stored when the counter function selection is executed. The count values when the latch counter, sampling counter and periodic pulse counter functions are executed are stored in the counter function selection count value storage buffer memory at the addresses shown in the table below.

| Contents              |     | Present value | Counter function selection count value |                      |                                     |                                    |
|-----------------------|-----|---------------|----------------------------------------|----------------------|-------------------------------------|------------------------------------|
|                       |     |               | Latch count value                      | Sampling count value | Periodic pulse count previous value | Periodic pulse count present value |
| Buffer memory address | CH1 | 2H to 3H      | CH to DH                               | EH to FH             | 10H to 11H                          | 12H to 13H                         |
|                       | CH2 | 22H to 23H    | 2CH to 2DH                             | 2EH to 2FH           | 30H to 31H                          | 32H to 33H                         |

The present values and counter function selection count values are stored as 32-bit signed binary values in the buffer memory. Also, since the contents of the buffer memory are automatically updated by the count operation, the latest count values can be read from the buffer memory.

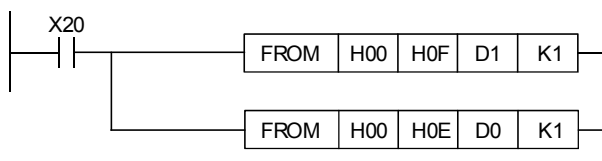
## POINT

- (1) When reading the present and counter function selection count values, use the DFRO command and always read values in two-word units. When reading values in one-word units, if the count values are updated in the middle of read processing, a mismatch may occur between the data contents of the lower and higher words, possibly causing the system to read incorrect count values.

[Program example]



[Example of an undesirable program]



- (2) Although the latch count value and present periodic pulse count value are stored in different addresses, the same values are always stored (updated at the same time). Thus, when the latch counter function or periodic pulse counter function is executed, the present periodic pulse count value and latch count value do not retain their previous values.

## 6.1.2 Count error

With the counter function selection, an error occurs in the count when it is executed using an external input (voltage applied to the function start input terminal) or by a sequence program (counter function selection start command ON).

The following explains how to calculate the count error.

- (1) Count error (maximum) due to input response delay when using an external input

$$\left( \frac{1 \text{ [ms]}}{1000} \right) [\text{s}] \times \text{pulse input speed [PPS]} \times \text{multiple [count]}$$

- (2) Count error (maximum) when the counter function selection is executed by a sequence program

$$\left( \frac{1 \text{ scan time [ms]}}{1000} \right) [\text{s}] \times \text{pulse input speed [PPS]} \times \text{multiple [count]}$$

- (3) Count error (maximum) due to the internal clock when executing the sampling counter function and periodic pulse counter function

$$\left( \frac{\text{Sampling/cycle time setting value} \times 10 \text{ [ms]}}{1000} \right) [\text{s}] \times \frac{\text{Error in parts dimensions, 100 [ppm]}}{1000000}$$

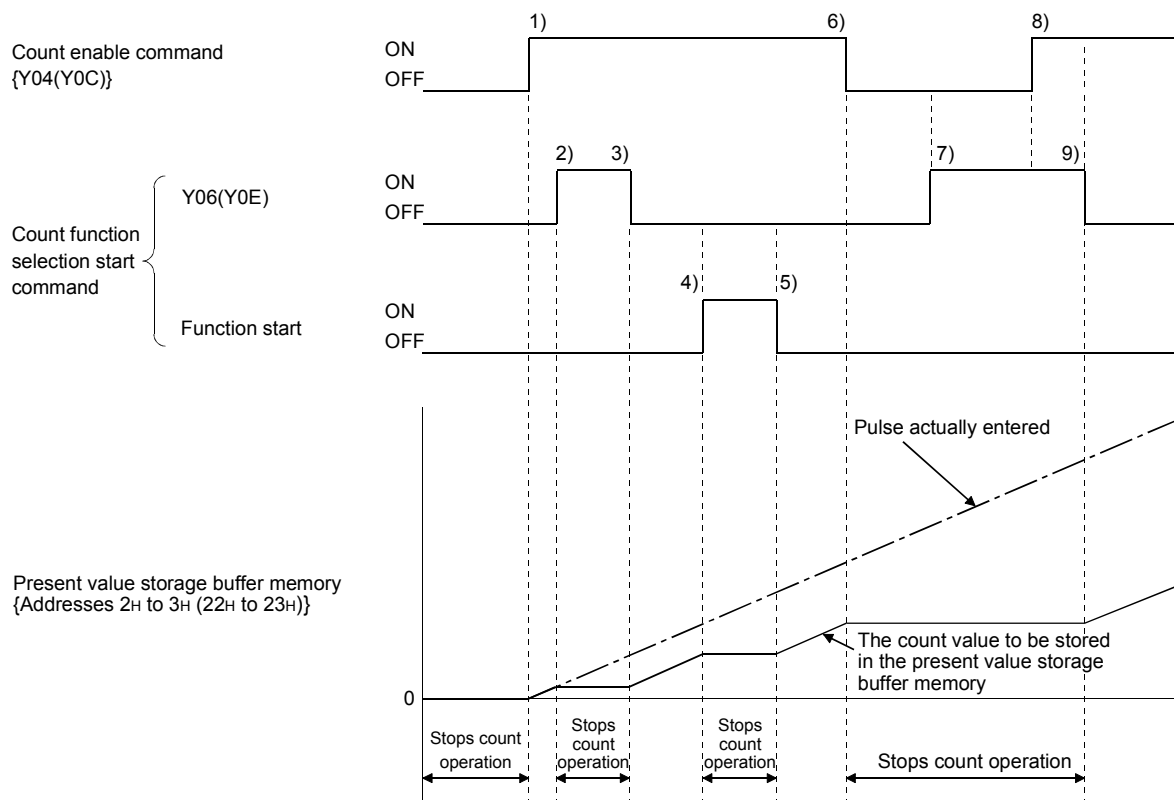
$$\times \text{Pulse input speed [pps]} \times \text{Multiplier factor [count]}$$

$$= \frac{(\text{Sampling/cycle time setting value (unit: 10ms)}) \times \text{Pulse input speed [pps]} \times \text{Multiplier factor [count]}}{1000000}$$

## 6.2 Using the Disable Count Function

The disable count function stops the count operation while the count enable command is ON.

The relationships between the count enable command, counter function selection start command and the present counter value are illustrated below.

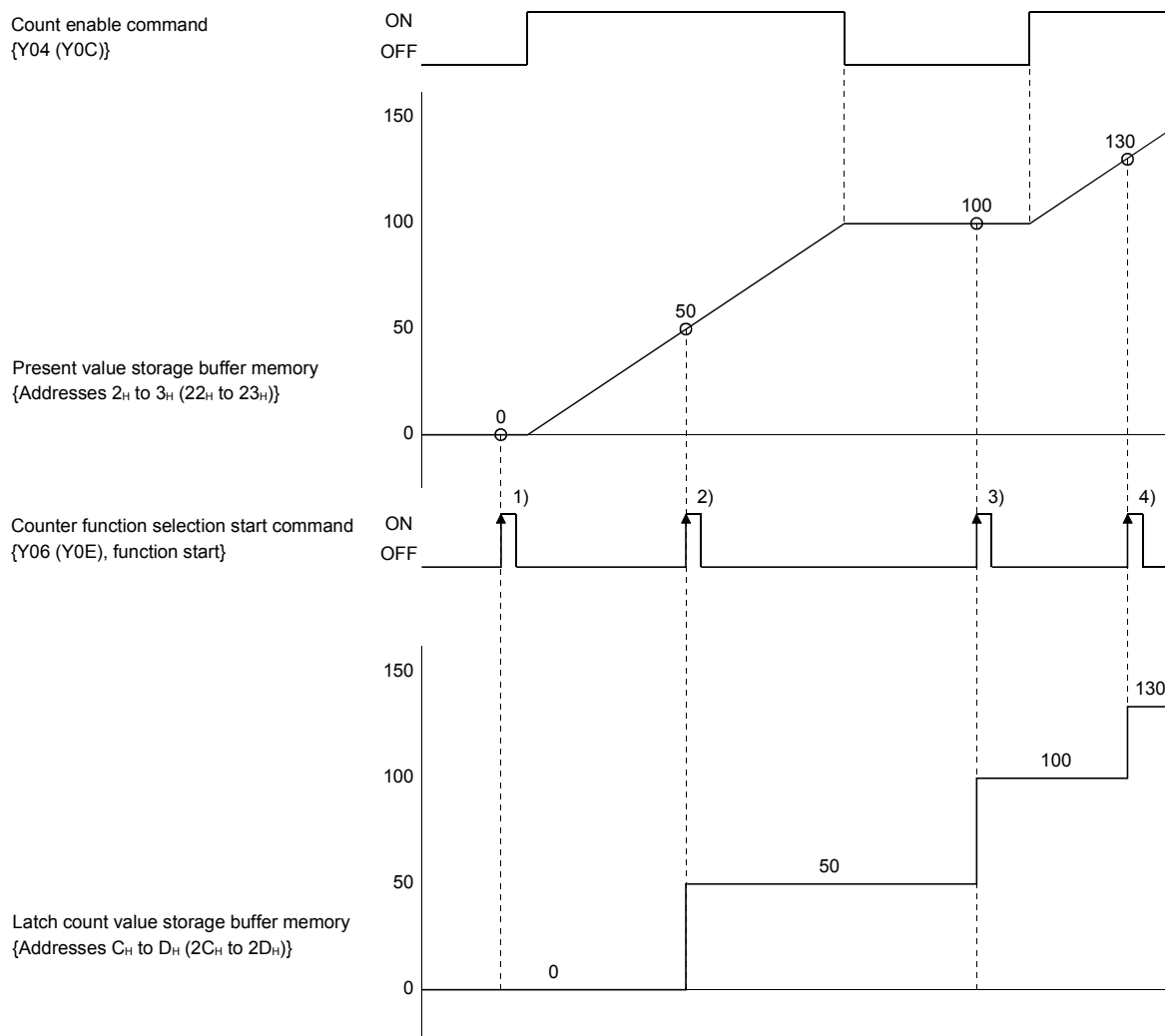


| Number | Description                                                                                                                           |
|--------|---------------------------------------------------------------------------------------------------------------------------------------|
| 1)     | Count operation starts when the count enable command {Y04 (Y0C)} turns ON.                                                            |
| 2)     | Count operation stops when the counter function selection start command {Y06 (Y0E)} turns ON.                                         |
| 3)     | Count operation resumes when the counter function selection start command {Y06 (Y0E)} turns OFF.                                      |
| 4)     | Count operation stops when the count function selection start command (function start) turns on.                                      |
| 5)     | Count operation resumes when the count function selection start command (function start) turns off.                                   |
| 6)     | Count operation stops when the count enable command turns OFF.                                                                        |
| 7)     | Count operation stops regardless of the status of the counter function selection start command since the count enable command is OFF. |
| 8)     | Count operation stays stopped even if the count enable command turns ON, since the counter function selection start command is ON.    |
| 9)     | Count operation resumes when the counter function selection start command turns OFF.                                                  |

## 6.3 Using the Latch Counter Function

The latch counter function latches the present counter value at the time a signal was entered.

The relationships between the present counter value for the latch counter function, the counter function selection start command and the latch count value storage buffer memory are illustrated below:

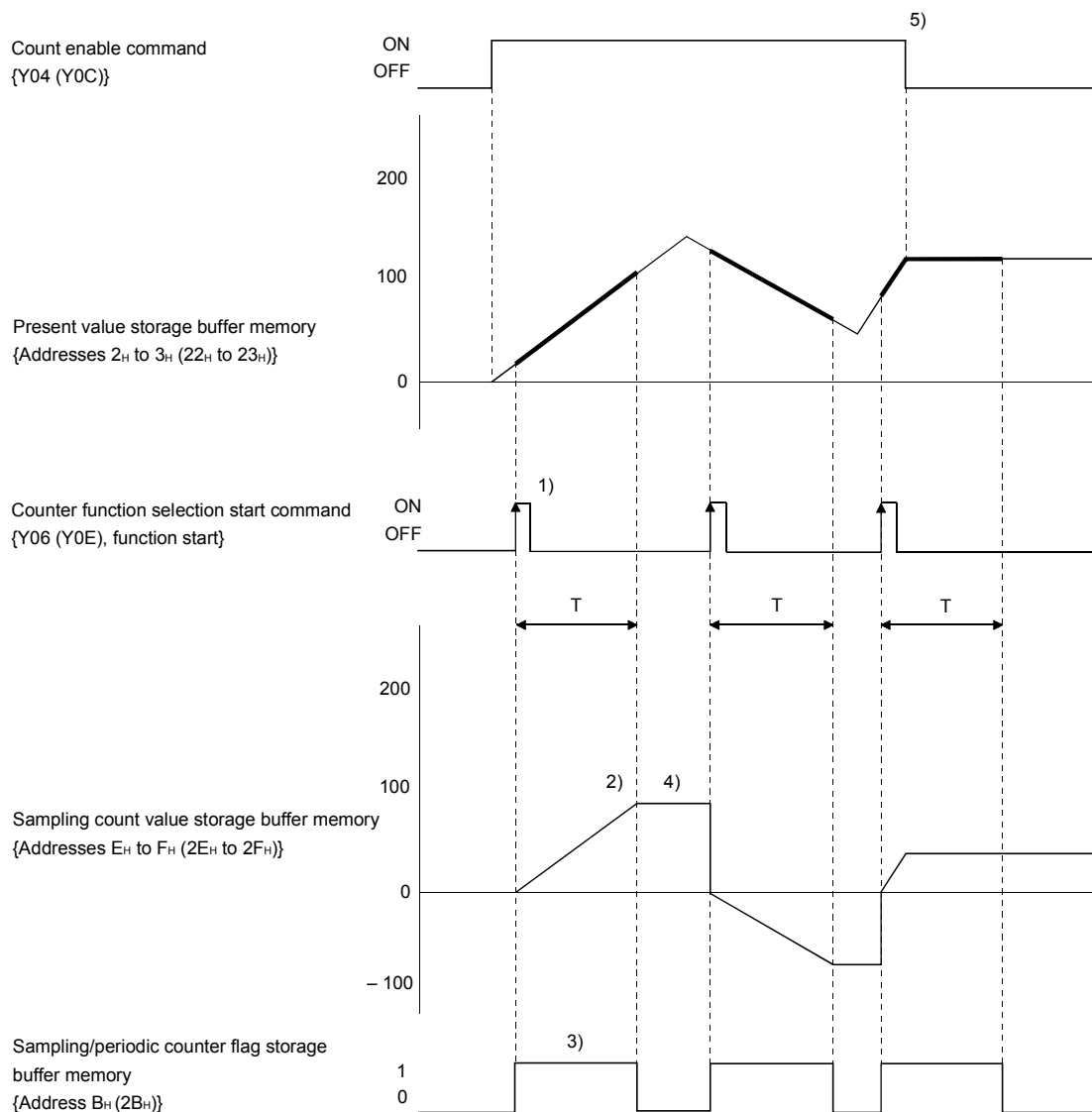


When the counter function selection start command {Y06 (Y0E), function start input} rises at points indicated by 1) to 4) in the figure above, the present counter value is stored in the latch count value storage buffer memory {addresses CH to DH (2CH to 2DH)}. The latch counter function is executed regardless of whether the count enable command {Y04 (Y0C)} turns ON/OFF.

## 6.4 Using the Sampling Counter Function

The sampling counter function counts the pulses that are entered during the specified sampling time period.

The relationships between the signals, buffer memory, etc. in the sampling counter function are illustrated below.

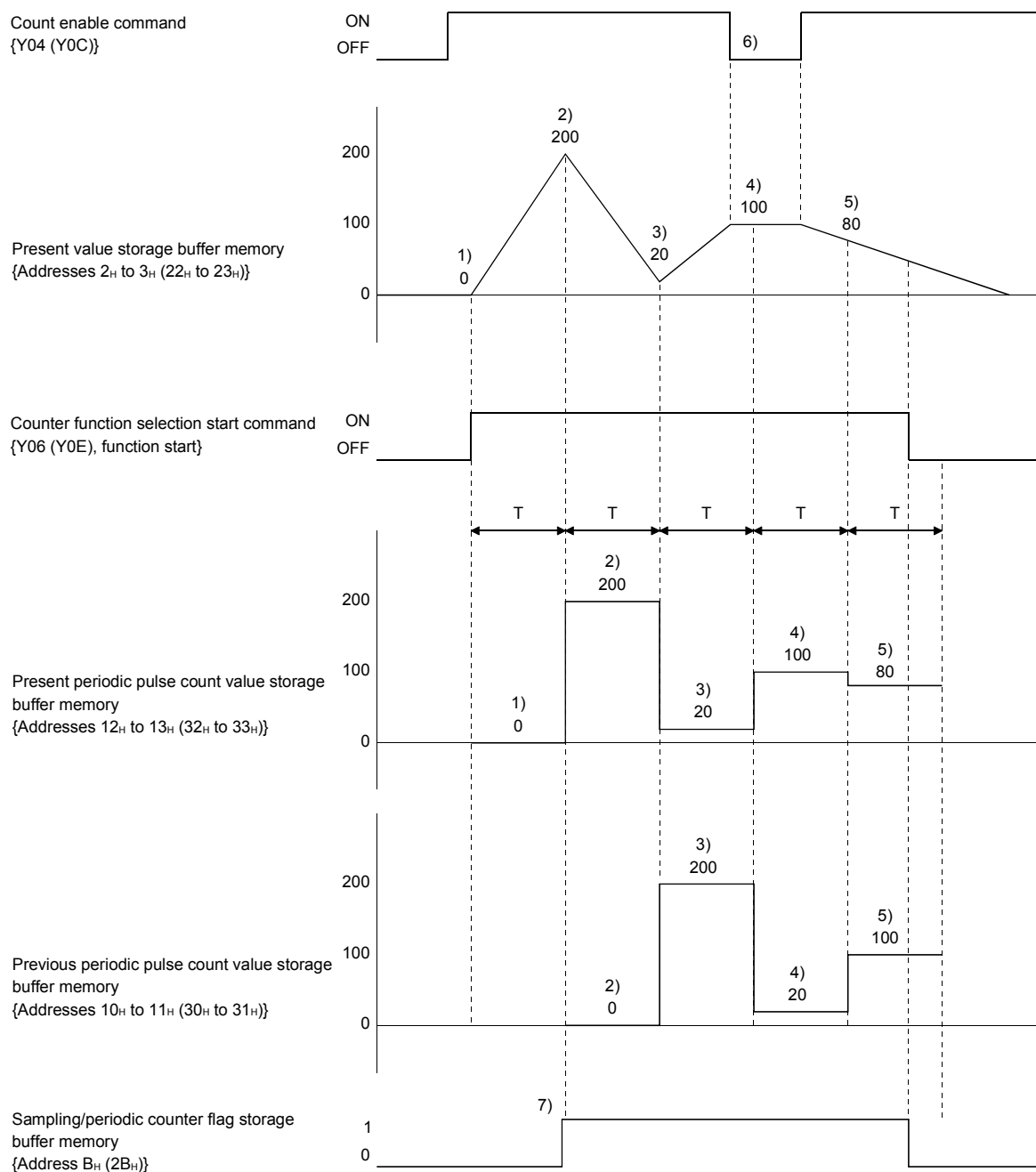


| Number | Description                                                                                                                                                                 |
|--------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1)     | The pulses entered are counted from 0 at the rise of the counter function selection start command {Y06 (Y0E), function start input}.                                        |
| 2)     | When the specified sampling time period elapses, the count stops.                                                                                                           |
| 3)     | While the sampling counter function is being executed, 1 is stored in the sampling/periodic counter flag storage buffer memory {address B <sub>H</sub> (2B <sub>H</sub> )}. |
| 4)     | Even if the execution of the sampling counter function ends, the value in the sampling count value storage buffer memory is saved.                                          |
| 5)     | The sampling counter function is executed regardless of whether the count enable command {Y04 (Y0C)} turns ON/OFF.                                                          |

## 6.5 Using the Periodic Pulse Counter Function

The periodic pulse counter function stores the present and previous counter values for each specified periodic time (T) as the present and previous values.

The relationships between the signals, buffer memory, etc. in the periodic pulse counter function are illustrated below.

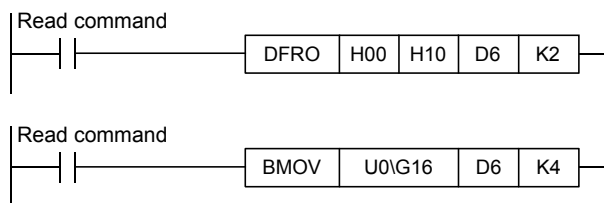


| Number | Description                                                                                                                                                                                                                                                                                                                                                                    |
|--------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1)     | The present counter value of 0 is stored in the present periodic pulse count value storage buffer memory {addresses 12 <sub>H</sub> to 13 <sub>H</sub> (32 <sub>H</sub> to 33 <sub>H</sub> )} (hereinafter called the present value buffer memory).                                                                                                                            |
| 2)     | The present counter value of 200 is stored in the present value buffer memory. The value 0 that has been stored in the present value buffer memory will be stored in the previous periodic pulse count value storage buffer memory {addresses 10 <sub>H</sub> to 11 <sub>H</sub> (30 <sub>H</sub> to 31 <sub>H</sub> )} (hereinafter called the previous value buffer memory). |
| 3)     | The present counter value of 20 is stored in the present value buffer memory. The value 200 that has been stored in the present value buffer memory will be stored in the previous value buffer memory.                                                                                                                                                                        |
| 4)     | The present counter value of 100 is stored in the present value buffer memory. The value 20 that has been stored in the present value buffer memory will be stored in the previous value buffer memory.                                                                                                                                                                        |
| 5)     | The present counter value of 80 is stored in the present value buffer memory. The value 100 that has been stored in the present value buffer memory will be stored in the previous value buffer memory.                                                                                                                                                                        |
| 6)     | The periodic pulse counter function is executed regardless of whether the count enable command {Y04 (Y0C)} is ON or OFF.                                                                                                                                                                                                                                                       |
| 7)     | Value 1 is stored in the sampling/periodic counter flag storage buffer memory {address B <sub>H</sub> (2B <sub>H</sub> )} while the periodic pulse counter function is being executed.                                                                                                                                                                                         |

### POINT

When reading a previous value {buffer memory address 10<sub>H</sub> to 11<sub>H</sub> (30<sub>H</sub> to 31<sub>H</sub>)} and a present value {buffer memory address 12<sub>H</sub> to 13<sub>H</sub> (32<sub>H</sub> to 33<sub>H</sub>)} of the periodic pulse count, read 4 contiguous words using the DFRO or BMOV instruction.

[Program example]



Depending on the relation between the update timings of the previous and present periodic pulse count values inside the module and the read timing in the sequence program, the previous value may be the same as the present value. If this has occurred, execute the reading again. (See Section 8.2.)

## 7 UTILITY PACKAGE (GX Configurator-CT)

### 7.1 Functions of the Utility Package

Table 7.1 lists the functions of the utility package.

Table 7.1 Utility package (GX Configurator-CT) function list

| Function        | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Reference section |
|-----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|
| Initial setting | <p>(1) Performs initial settings for each channel to operate the QD62 (E/D).<br/>Sets values for the following items that require initial setting.</p> <ul style="list-style-type: none"> <li>• CH□ Preset value setting</li> <li>• CH□ Coincidence output point set No.1</li> <li>• CH□ Coincidence output point set No.2</li> <li>• CH□ Counter function selection setting</li> <li>• CH□ Sampling/periodic setting [unit: 10 ms]</li> <li>• CH□ Ring counter maximum value</li> <li>• CH□ Ring counter minimum value</li> </ul> <p>(2) The data for which initial setting has been completed is registered in the programmable controller CPU parameters, and automatically written to the QD62 (E/D) when the programmable controller CPU is placed in the RUN status.</p> | Section 7.4       |
| Auto refresh    | <p>(1) The QD62 (E/D)'s buffer memory is configured for automatic refresh.</p> <ul style="list-style-type: none"> <li>• CH□ Preset value</li> <li>• CH□ Latch count value</li> <li>• CH□ Sampling count value</li> <li>• CH□ Periodic pulse counter present value</li> <li>• CH□ Periodic pulse counter previous value</li> <li>• CH□ Sampling/periodic counter flag</li> <li>• CH□ Overflow detection flag</li> </ul> <p>(2) Values set for auto refresh and stored in the QD62 (E/D)'s buffer memory are automatically read out when the END instruction is executed in the programmable controller CPU.</p>                                                                                                                                                                 | Section 7.5       |
| Monitoring/test | <p>The buffer memory and I/O signals of the QD62 (E/D) are monitored or tested.</p> <ul style="list-style-type: none"> <li>• X/Y device</li> <li>• CH□ Present value</li> <li>• CH□ Preset function</li> <li>• CH□ Coincidence output function</li> <li>• CH□ Counter selection function</li> <li>• CH□ Ring counter function</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                       | Section 7.6       |

## 7.2 Installing and Uninstalling the Utility Package

For how to install or uninstall the utility package, refer to "Method of installing the MELSOFT Series" included in the utility package.

### 7.2.1 Handling precautions

The following explains the precautions on using the utility package.

(1) For safety

Since the utility is add-in software for GX Developer, read "Safety Precautions" and the basic operating procedures in the GX Developer Operating Manual.

(2) About installation

GX Configurator-CT is add-in software for GX Developer Version 4 or later. Therefore, GX Configurator-CT must be installed on the personal computer that has already GX Developer Version 4 or later installed.

(3) Screen error of Intelligent function module utility

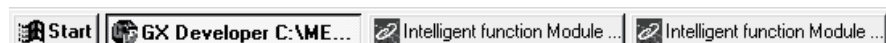
Insufficient system resource may cause the screen to be displayed inappropriately while using the Intelligent function module utility. If this occurs, close the Intelligent function module utility, GX Developer (program, comments, etc.), and other applications, and then start GX Developer and Intelligent function module utility again.

(4) To start the Intelligent function module utility

- (a) In GX Developer, select "QCPU (Q mode)" for PLC series and specify a project. If any other than "QCPU (Q mode)" is selected for PLC series, or if no project is specified, the Intelligent function module utility will not start.
- (b) Multiple Intelligent function module utilities can be started. However, [Open file] and [Save file] operations under [Intelligent function module parameter] are allowed for one Intelligent function module utility only. Only the [Monitor/test] operation is allowed for the other utilities.

(5) Switching between two or more Intelligent function module utilities

When two or more Intelligent function module utility screens cannot be displayed side by side, select a screen to be displayed on the top of others using the task bar.



## (6) Number of parameters that can be set in GX Configurator-CT

The number of parameters that can be set by the GX Configurator for an intelligent function module installed in the CPU module and in a remote I/O station of the MELSECNET/H network system is limited.

| When intelligent function modules are installed to: | Maximum number of parameter settings |                      |
|-----------------------------------------------------|--------------------------------------|----------------------|
|                                                     | Initial setting                      | Auto refresh setting |
| Q00J/Q00/Q01CPU                                     | 512                                  | 256                  |
| Q02/Q02H/Q06H/Q12H/Q25HCPU                          | 512                                  | 256                  |
| Q12PH/Q25PHCPU                                      | 512                                  | 256                  |
| Q12PRH/Q25PRHCPU                                    | 512                                  | 256                  |
| Q02UCPU                                             | 2048                                 | 1024                 |
| Q03UD/Q04UDH/Q06UDHCPU                              | 4096                                 | 2048                 |
| MELSECNET/H remote I/O station                      | 512                                  | 256                  |

For example, if multiple intelligent function modules are installed to a remote I/O station, configure the settings in GX Configurator so that the number of parameters set for all the intelligent function modules does not exceed the limit of the remote I/O station. Calculate the total number of parameter settings separately for the initial setting and for the auto refresh setting.

The number of parameters that can be set for one module in GX Configurator-CT is as shown below.

| Target module    | Initial setting | Auto refresh setting |
|------------------|-----------------|----------------------|
| QD62/QD62E/QD62D | 8 (Fixed)       | 14 (Max.)            |

Example) Counting the number of parameter settings in Auto refresh setting

The number of settings in this one line is counted as one setting.  
The number of settings is not counted by columns.  
Add up all the setting items in this setting screen, then add them to the total for the other intelligent function modules to get a grand total.

## 7.2.2 Operating environment

This section explains the operating environment of the personal computer that runs GX Configurator-CT.

| Item                                        |                  | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|---------------------------------------------|------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Installation (Add-in) target * <sup>1</sup> |                  | Add-in to GX Developer Version 4 (English version) or later * <sup>2</sup>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Computer                                    |                  | Windows® -based personal computer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|                                             | CPU              | Refer to the following table "Operating system and performance required for personal computer".                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|                                             | Required memory  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Hard disk space * <sup>3</sup>              | For installation | 65 MB or more                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|                                             | For operation    | 10 MB or more                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Display                                     |                  | 800 × 600 dots or more resolution * <sup>4</sup>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Operating system                            |                  | Microsoft® Windows® 95 Operating System (English version)<br>Microsoft® Windows® 98 Operating System (English version)<br>Microsoft® Windows® Millennium Edition Operating System (English version)<br>Microsoft® Windows NT® Workstation Operating System Version 4.0 (English version)<br>Microsoft® Windows® 2000 Professional Operating System (English version)<br>Microsoft® Windows® XP Professional Operating System (English version)<br>Microsoft® Windows® XP Home Edition Operating System (English version)<br>Microsoft® Windows Vista® Home Basic Operating System (English version)<br>Microsoft® Windows Vista® Home Premium Operating System (English version)<br>Microsoft® Windows Vista® Business Operating System (English version)<br>Microsoft® Windows Vista® Ultimate Operating System (English version)<br>Microsoft® Windows Vista® Enterprise Operating System (English version) |

\*1: Install GX Configurator-CT in GX Developer Version 4 or higher in the same language.

\*2: GX Configurator-CT is not applicable to GX Developer Version 3 or earlier.

\*3: At least 15GB is required for Windows Vista®.

\*4: Resolution of 1024 X 768 dots or more is recommended for Windows Vista®.

## Operating system and performance required for personal computer

| Operating system                                  | Performance required for personal computer |               |
|---------------------------------------------------|--------------------------------------------|---------------|
|                                                   | CPU                                        | Memory        |
| Windows® 95                                       | Pentium® 133MHz or more                    | 32MB or more  |
| Windows® 98                                       | Pentium® 133MHz or more                    | 32MB or more  |
| Windows® Me                                       | Pentium® 150MHz or more                    | 32MB or more  |
| Windows NT® Workstation 4.0                       | Pentium® 133MHz or more                    | 32MB or more  |
| Windows® 2000 Professional                        | Pentium® 133MHz or more                    | 64MB or more  |
| Windows® XP Professional (Service Pack 1 or more) | Pentium® 300MHz or more                    | 128MB or more |
| Windows® XP Home Edition (Service Pack 1 or more) | Pentium® 300MHz or more                    | 128MB or more |
| Windows Vista® Home Basic                         | Pentium® 1GHz or more                      | 1GB or more   |
| Windows Vista® Home Premium                       | Pentium® 1GHz or more                      | 1GB or more   |
| Windows Vista® Business                           | Pentium® 1GHz or more                      | 1GB or more   |
| Windows Vista® Ultimate                           | Pentium® 1GHz or more                      | 1GB or more   |
| Windows Vista® Enterprise                         | Pentium® 1GHz or more                      | 1GB or more   |

## POINT

- The functions shown below are not available for Windows® XP and Windows Vista®.

If any of the following functions is attempted, this product may not operate normally.

Start of application in Windows® compatible mode

Fast user switching

Remote desktop

Large fonts (Details setting of Display Properties)

Also, 64-bit version Windows® XP and Windows Vista® are not supported.

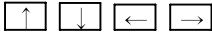
- Use a USER authorization or higher in Windows Vista®.

## 7.3 Explanation of Utility Package Operations

### 7.3.1 How to perform common utility package operations

#### (1) Control keys

Special keys that can be used for operation of the utility package and their applications are shown in the table below.

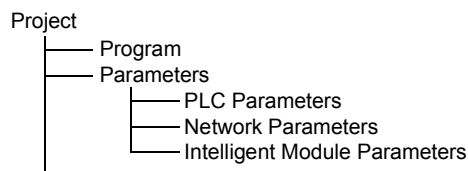
| Key                                                                                 | Application                                                                                                                       |
|-------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------|
|    | Cancels the current entry in a cell.<br>Closes the window.                                                                        |
|    | Moves between controls in the window.                                                                                             |
|    | Used in combination with the mouse operation to select multiple cells for test execution.                                         |
|    | Deletes the character where the cursor is positioned.<br>When a cell is selected, clears all of the setting contents in the cell. |
|    | Deletes the character where the cursor is positioned.                                                                             |
|    | Moves the cursor.                                                                                                                 |
|  | Moves the cursor one page up.                                                                                                     |
|  | Moves the cursor one page down.                                                                                                   |
|  | Completes the entry in the cell.                                                                                                  |

#### (2) Data created with the utility package

The following data or files that are created with the utility package can be also handled in GX Developer. Figure 6.1 shows respective data or files are handled in which operation.

#### <Intelligent function module parameter>

- (a) This represents the data created in Auto refresh setting, and they are stored in an intelligent function module parameter file in a project created by GX Developer.



- (b) Steps 1) to 3) shown in Figure 7.1 are performed as follows:

- 1) From GX Developer, select:  
[Project] → [Open project] / [Save] / [Save as]
- 2) From the module selection screen of the utility, select:  
[Intelligent function module parameter] → [Open parameters] / [Save parameters]

- 3) From GX Developer, select:  
 [Online] → [Read from PLC] / [Write to PLC] → "Intelligent function module parameters"  
 Or, from the module selection screen of the utility,  
 [Online] → [Read from PLC] / [Write to PLC]

#### <Text files>

- (a) A text file can be created by clicking the **Make text file** button on the initial setting, Auto refresh setting, or Monitor/Test screen. The text files can be utilized to create user documents.
- (b) Text files can be saved in any directory. However, a path (folder where the file is to be saved) cannot be created during **Make text file** operation, so create a folder in advance for saving the file using Windows® Explorer.

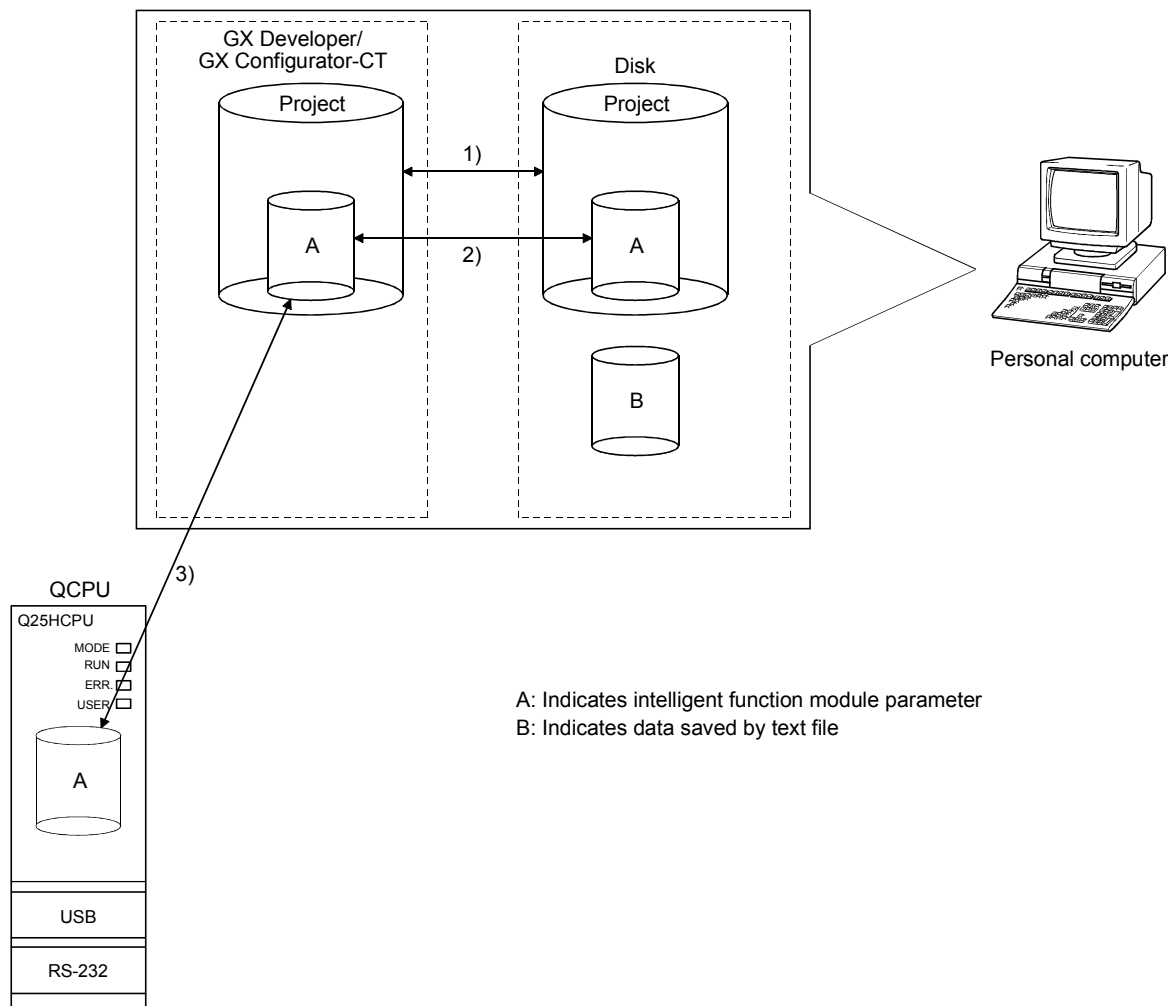
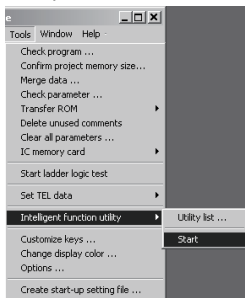


Figure 7.1 Correlation chart for data created with the utility package

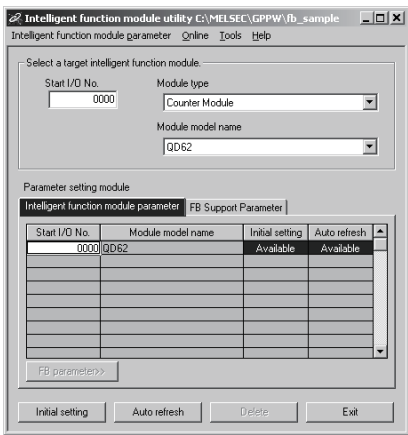
7.3.2 Operation overview

GX Developer screen



[Tools] – [Intelligent function utility] – [Start]

Screen for intelligent function module parameter setting module select



Enter "Start I/O No.", then select "Module type" and "Module model name".

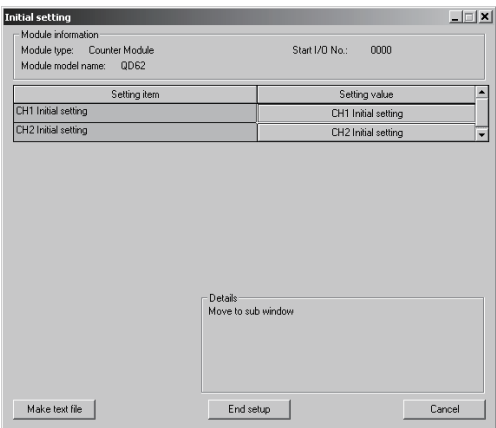
See Section 7.3.3

Initial setting

Auto refresh

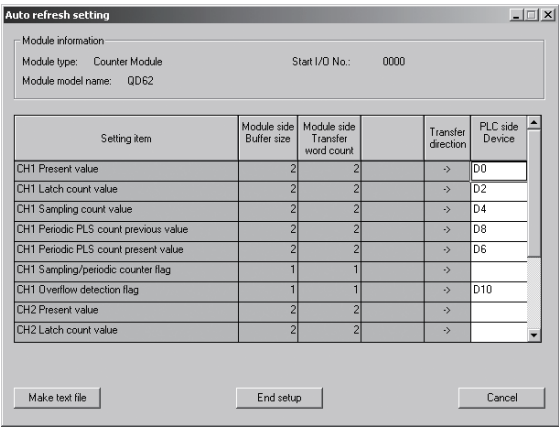
1)

Initial setting screen



See Section 7.4

Auto refresh setting screen



See Section 7.5

1) [Online] – [Monitor/test]

Select monitor/test module screen

| Start I/O No. | Module model name |
|---------------|-------------------|
| 0000          | QD62              |
|               |                   |
|               |                   |
|               |                   |
|               |                   |
|               |                   |
|               |                   |
|               |                   |
|               |                   |
|               |                   |

Monitor/test Select a module to be monitored/tested.

Monitor/test screen

| Setting item                | Current value | Setting value      |
|-----------------------------|---------------|--------------------|
| CH1 Down count command      | OFF           | OFF                |
| CH1 Count enable command    | Disable       | Disable            |
| CH2 Present value           | 0             |                    |
| CH2 Overflow detection flag | No detection  |                    |
| CH2 Down count command      | OFF           | OFF                |
| CH2 Count enable command    | Disable       | Disable            |
| XY Monitor/Test             |               | XY Monitor/Test    |
| Preset function             |               | Preset             |
| Coincidence output function |               | Coincidence output |
| Counter selection function  |               | Counter selection  |
| Ring counter function       |               | Ring counter       |

See Section 7.6

## 7.3.3 Starting the Intelligent function module utility

## [Purpose]

Starting the Intelligent function module utility from GX Developer, activate the screen for selecting a module to set parameters. From this screen, the screen for configuring auto refresh of the QD62 (E/D), and the screen for selecting a module to be monitored/tested can be started.

## [Operating procedure]

[Tools] → [Intelligent function utility] → [Start]

## [Setting screen]

## [Explanation of items]

## (1) Activation of other screens

## (a) Starting the initial setting

"Start I/O No. \*" → "Module type" → "Module model name" →

**Initial setting**

## (b) Auto refresh setting screen

"Start I/O No. \*" → "Module type" → "Module model name" →

**Auto refresh**

## (c) Monitor/test module selection screen

[Online] → [Monitor/Test]

\* Enter the start I/O No. in hexadecimal

## (2) Command buttons

**Delete**

Deletes the initial setting and auto refresh setting of the selected module.

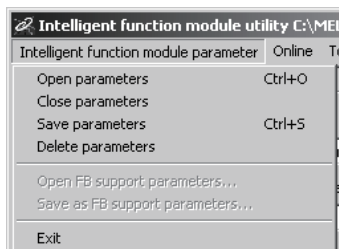
**Exit**

Closes this screen.

## (3) Menu bar

## (a) File menu

Intelligent function module parameters of the project opened by GX Developer are handled.



[Open parameters] : Reads a parameter file.

[Close parameters] : Closes the parameter file. If any data are modified, a dialog asking for file saving will appear.

[Save parameters] : Saves the parameter file.

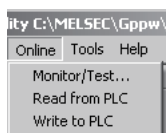
[Delete parameters] : Deletes the parameter file.

[Open FB support parameter...] : Opens a FB support parameter file.

[Save as FB support parameter...] : Saves a FB support parameter.

[Exit] : Exits the Intelligent function module utility.

## (b) Online menu



[Monitor/Test] : Activates the Select monitor/test module screen.

[Read from PLC] : Reads intelligent function module parameters from the CPU module.

[Write to PLC] : Writes intelligent function module parameters to the CPU module.

## POINT

## (1) Saving intelligent function module parameters in a file

Since intelligent function module parameters cannot be saved in a file by the project saving operation of GX Developer, save them on the shown module selection screen.

## (2) Reading/writing intelligent function module parameters from/to a programmable controller CPU using GX Developer

(a) Intelligent function module parameters can be read from and written into a programmable controller after having been saved in a file.

(b) Set a target programmable controller CPU in GX Developer: [Online] → [Transfer setup].

(c) When the QD62 (E/D) is mounted to the remote I/O station, use "Read from PLC" and "Write to PLC" of GX Developer.

## (3) Checking the required utility

While the start I/O is displayed on the Intelligent function module utility setting screen, "\*" may be displayed for the model name.

This means that the required utility has not been installed or the utility cannot be started from GX Developer.

Check the required utility, selecting [Tools] - [Intelligent function utility] - [Utility list...] in GX Developer.

## 7.4 Initial Settings

### [Purpose of operation]

Perform the initial settings for each channel to operate the QD62 (E/D).

Set the following initial setting parameters:

- Preset value
- Coincidence output point set No.1
- Coincidence output point set No.2
- Counter function selection setting
- Sampling/periodic setting
- Ring counter maximum value
- Ring counter minimum value

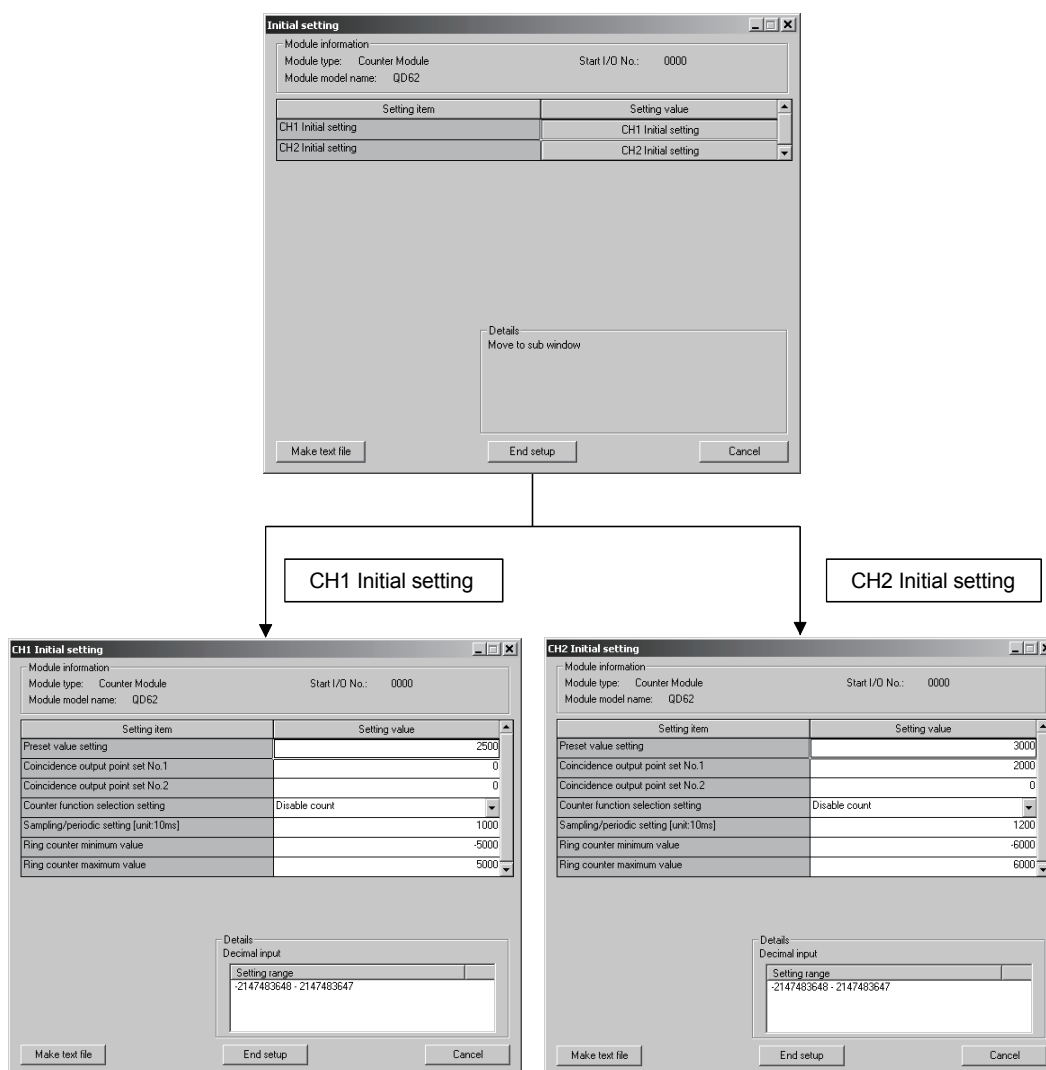
These initial settings eliminate the need to set sequence programs.

### [Startup procedure]

"Start I/O No. \*" → "Module type" → "Module model name" → Initial setting

\* Enter the start I/O No. in hexadecimal

### [Setting screen]



## [Explanation of items]

## (1) Command buttons

Creates a file containing the screen data in text file format.

Saves the set data and ends the operation.

Cancels the setting and ends the operation.

**POINT**

Initial settings are stored in the intelligent module parameters.

After being written to the CPU module, the initial setting is made effective by either (1) or (2).

(1) Cycle the RUN/STOP switch of the CPU module: STOP → RUN → STOP → RUN.

(2) With the RUN/STOP switch set to RUN, turn off and then on the power or reset the CPU module.

If the initialization settings have been written by a sequence program, the initialization settings will be executed during the STOP → RUN of the CPU module.

Arrange so that the initial settings written by the sequence program are re-executed during the STOP → RUN of the CPU module.

## 7.5 Auto Refresh

### [Purpose]

Set the QD62 (E/D) buffer memory to be automatically refreshed, for each channel.

Set the following auto refresh setting parameters:

- Present value
- Latch count value
- Sampling count value
- Periodic pulse counter present value
- Periodic pulse counter previous value
- Sampling/periodic counter flag
- Overflow detection flag

This auto refresh setting eliminates the need for reading and writing by sequence programs.

### [Operating procedure]

"Start I/O No. \*" → "Module type" → "Module model name" → Auto refresh

\* Enter the start I/O No. in hexadecimal.

### [Setting screen]

**Auto refresh setting**

Module information

Module type: Counter Module      Start I/O No.: 0000

Module model name: QD62

| Setting item                          | Module side Buffer size | Module side Transfer word count | Transfer direction | PLC side Device |
|---------------------------------------|-------------------------|---------------------------------|--------------------|-----------------|
| CH1 Present value                     | 2                       | 2                               | ->                 | D0              |
| CH1 Latch count value                 | 2                       | 2                               | ->                 | D2              |
| CH1 Sampling count value              | 2                       | 2                               | ->                 | D4              |
| CH1 Periodic PLS count previous value | 2                       | 2                               | ->                 | D8              |
| CH1 Periodic PLS count present value  | 2                       | 2                               | ->                 | D6              |
| CH1 Sampling/periodic counter flag    | 1                       | 1                               | ->                 |                 |
| CH1 Overflow detection flag           | 1                       | 1                               | ->                 | D10             |
| CH2 Present value                     | 2                       | 2                               | ->                 |                 |
| CH2 Latch count value                 | 2                       | 2                               | ->                 |                 |

Make text file      End setup      Cancel

## [Explanation of items]

## (1) Items

Module side Buffer size : Displays the buffer memory size of the setting item.

Module side Transfer word count : Displays the number of words to be transferred.

Transfer direction : "←" indicates that data are written from the programmable controller CPU to the buffer memory.  
"→" indicates that data are loaded from the buffer memory to the programmable controller CPU.

PLC side Device : Enter a CPU module side device that is to be automatically refreshed.

Applicable devices are X, Y, M, L, B, T, C, ST, D, W, R, and ZR.

When using bit devices X, Y, M, L or B, set a number that can be divided by 16 points (examples: X10, Y120, M16, etc.)

Also, buffer memory data are stored in a 16-point area, starting from the specified device number. For example, if X10 is entered, data are stored in X10 to X1F.

## (2) Command buttons

Creates a file containing the screen data in text file format.

Saves the set data and ends the operation.

Cancels the setting and ends the operation.

**POINT**

- The auto refresh settings are stored in an intelligent function module parameter file.  
The auto refresh settings become effective by turning the power OFF and then ON or resetting the CPU module after writing the intelligent function module parameters to the CPU module.
- The auto refresh settings cannot be changed from sequence programs. However, processing equivalent to auto refresh can be added using the FROM/TO instruction in the sequence program.

7.6 Monitoring/Test

7.6.1 Monitoring/Test

[Purpose]

Start buffer memory monitoring/testing and I/O signal monitoring/testing from this screen.

[Operating procedure]

"Select monitor/test module" screen → "Start I/O No. \*" → "Module type " →

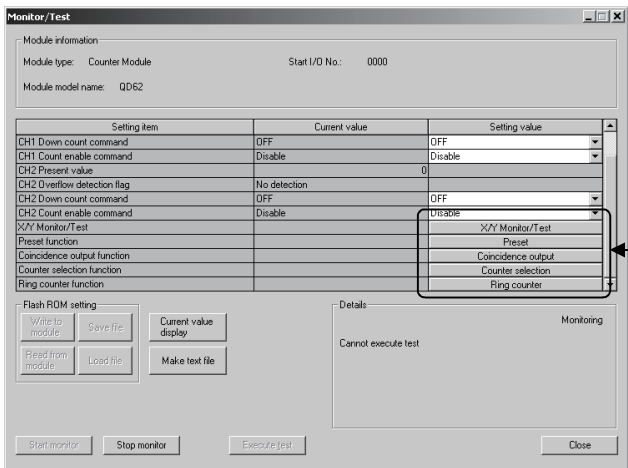
"Module model name" → **Monitor/test**

\*1 Enter the start I/O No. in hexadecimal

The screen can also be started from System monitor of GX Developer Version 6 or later.

Refer to the GX Developer Operating Manual for details.

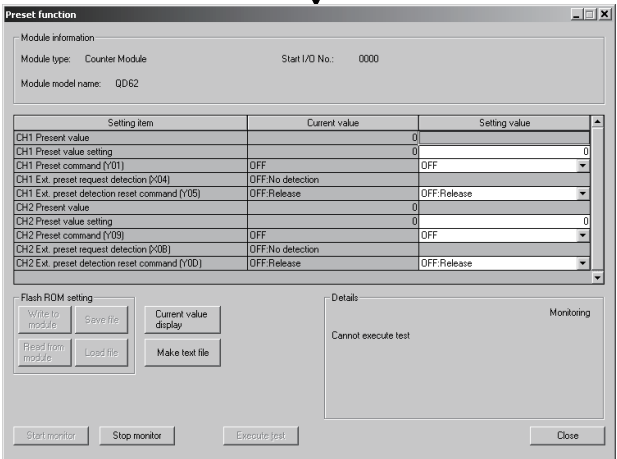
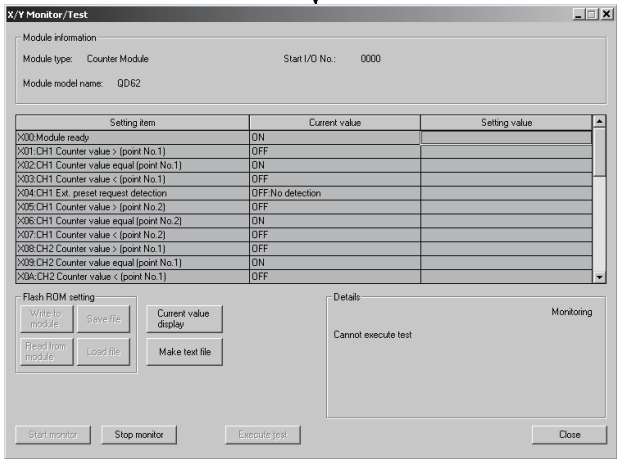
[Setting screen]



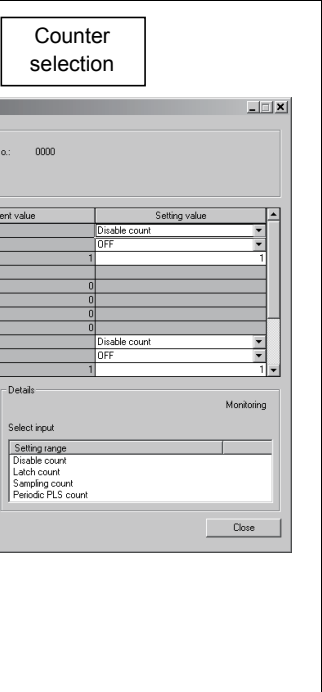
Selecting these buttons displays the following screens.

X/Y monitor/  
test screen

Preset



1) ←



Counter selection function

Module information

Module type: Counter Module Start I/O No.: 0000

Module model name: QD62

| Setting item                                       | Current value   | Setting value |
|----------------------------------------------------|-----------------|---------------|
| CH1 Counter function selection setting             | Disable count   | Disable count |
| CH1 Counter function selection start command (Y06) | OFF             | OFF           |
| CH1 Sampling/periodic setting [unit:10ms]          | 1               | 1             |
| CH1 Sampling/periodic counter flag                 | Idling function |               |
| CH1 Latch count value                              | 0               |               |
| CH1 Sampling count value                           | 0               |               |
| CH1 Periodic PLS count previous value              | 0               |               |
| CH1 Periodic PLS count present value               | 0               |               |
| CH2 Counter function selection setting             | Disable count   | Disable count |
| CH2 Counter function selection start command (Y0E) | OFF             | OFF           |
| CH2 Sampling/periodic setting [unit:10ms]          | 1               | 1             |

Flash ROM setting

Write to module Save file Current value display

Read from module Load file Make text file

Start monitor Stop monitor Execute test Close

Details

Monitoring

Select input

Setting range

Disable count

Latch count

Sampling count

Periodic PLS count

Coincidence output

Coincidence output function

Module information

Module type: Counter Module Start I/O No.: 0000

Module model name: QD62

| Setting item                                    | Current value | Setting value |
|-------------------------------------------------|---------------|---------------|
| CH1 Present value                               | 0             |               |
| CH1 Coincidence signal enable command (Y02)     | OFF:Disable   | OFF:Disable   |
| CH1 Coincidence output point set No.1           | 0             | 0             |
| CH1 Coincidence signal No.1 reset command (Y00) | OFF:Release   | OFF:Release   |
| CH1 Counter value > (point No.1) (X01)          | OFF           |               |
| CH1 Counter value equal (point No.1) (X02)      | DN            |               |
| CH1 Counter value < (point No.1) (X03)          | OFF           |               |
| CH1 Coincidence output point set No.2           | 0             | 0             |
| CH1 Coincidence signal No.2 reset command (Y07) | OFF:Release   | OFF:Release   |
| CH1 Counter value > (point No.2) (X05)          | OFF           |               |
| CH1 Counter value equal (point No.2) (X06)      | DN            |               |

Flash ROM setting

Write to module Save file Current value display

Read from module Load file Make text file

Start monitor Stop monitor Execute test Close

Details

Monitoring

Cannot execute test

Ring counter

Ring counter function

Module information

Module type: Counter Module Start I/O No.: 0000

Module model name: QD62

| Setting item                   | Current value | Setting value |
|--------------------------------|---------------|---------------|
| CH1 Ring counter minimum value | 0             | 0             |
| CH1 Ring counter maximum value | 0             | 0             |
| CH2 Ring counter minimum value | 0             | 0             |
| CH2 Ring counter maximum value | 0             | 0             |

Flash ROM setting

Write to module Save file Current value display

Read from module Load file Make text file

Start monitor Stop monitor Execute test Close

Details

Monitoring

Decimal input

Setting range

-2147483648 - 2147483647

## [Explanation of items]

## (1) Items

Setting item : Displays I/O signals and buffer memory names.

Current value : Monitors the I/O signal states and present buffer memory values.

Setting value : Enter or select values to be written into the buffer memory for test operation.

## (2) Command buttons

Displays the current value of the item selected.  
(This is used to check the text that cannot be displayed in the current value field. However, in this utility package, all items can be displayed in the display fields).

Creates a file containing the screen data in text file format.

/

Selects whether or not to monitor current values.

Performs a test on the selected items. To select more than one item, select them while holding down the  key.

Closes the screen that is currently open and returns to the previous screen.

**REMARK**

The following explains an example to change settings for the selected test operation to the following:

- Counter function selection setting : Sampling counter function
- Counter function selection start command (Y06) : ON
- Sampling/periodic setting [unit: 10 ms] : 1000 ms

- (1) Set "Sampling counter function" in the setting value field for CH□ Counter function selection setting.
- (2) Set "ON" in the setting value field for CH□ Counter function selection start command (Y06).
- (3) Click the setting value field for CH□ Sampling/periodic setting [unit: 10 ms].
- (4) After entering the sampling time, press the  key.  
At this point, nothing has been written to the QD62 (E/D).
- (5) Select the setting value fields that were specified in steps 1 to 4 while holding down the  key.

Multiple items can also be selected by dragging with the mouse.

- (6) Click  to execute write operation.

Once write operation is completed, the values that were written will be displayed in the current value field.

# MEMO

[illegible]

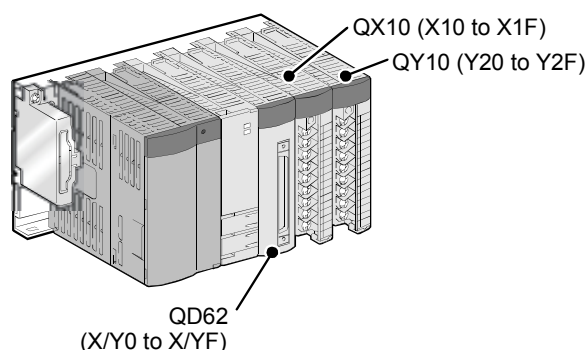
## 8 PROGRAMMING

This chapter describes QD62 (E/D) programs, whose system configuration example shown below, in the following two cases:

- GX Configurator-CT is used
- GX Configurator-CT is not used

When applying any of the program examples introduced in this chapter to the actual system, verify the applicability and confirm that no problem occurs in the system control.

### (1) System configuration



### (2) Setting conditions of the intelligent function module switch

Set the pulse input mode, counting speed setting, and counter format with the intelligent function module switch on GX Developer. (See Section 4.5.)

| Item | Pulse input mode      | Counting speed setting |
|------|-----------------------|------------------------|
| CH1  | 2-phase multiple of 1 | 200 kPPS               |

### (3) Program conditions

This program uses QD62 to perform counting with the conditions listed below.

| Item                           | Setting value |
|--------------------------------|---------------|
| Preset value                   | 2500          |
| Coincidence output point No. 1 | 1000          |
| Ring counter minimum value *1  | -5000         |
| Ring counter maximum value *1  | 5000          |
| Sampling time setting *2       | 10000 ms      |
| Periodic pulse time setting *3 | 5000 ms       |

\*1 Set only when a ring counter function is used

\*2 Set only when the sampling counter function is used

\*3 Set only when the periodic pulse counter function is used

#### POINT

Programs that were used in earlier products such as A1SD62(E/D/D-S1) cannot be used because the I/O signals and the buffer memory configuration of these products differ from those of QD62(E/D). The conventional dedicated instructions cannot be used.

## (b) Devices used by the user

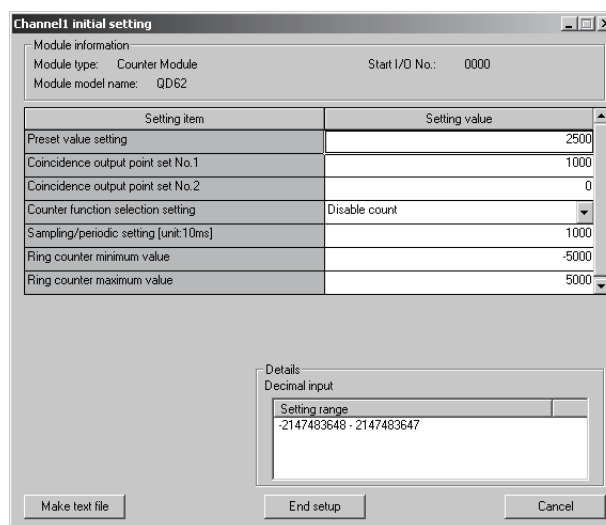
| Description                             | Device | Description                                              | Device     |
|-----------------------------------------|--------|----------------------------------------------------------|------------|
| Count operation start signal            | X10    | Periodic pulse count data read signal                    | X1C        |
| Current value read signal               | X11    | Periodic pulse count start signal                        | X1D        |
| Coincidence output data setting signal  | X12    | Coincidence confirmation LED signal                      | Y20        |
| Preset command signal                   | X13    | Overflow occurrence confirmation LED signal              | Y21        |
| Count operation stop signal             | X14    | Initial setting complete signal                          | M10        |
| Coincidence LED clear signal            | X15    | Current value storage                                    | D0 to D1   |
| Counter function execution start signal | X16    | Latch count value storage                                | D2 to D3   |
| Counter function execution stop signal  | X17    | Sampling count value storage                             | D4 to D5   |
| Latch count data read signal            | X18    | Periodic pulse count previous value storage              | D6 to D7   |
| Latch execution signal                  | X19    | Periodic pulse count present value storage               | D8 to D9   |
| Sampling count data read signal         | X1A    | Overflow status storage                                  | D10        |
| Sampling count start signal             | X1B    | Interrupt enabled flag storage for the IMASK instruction | D20 to D35 |

## 8.1 Program Example When GX Configurator-CT is Used

## 8.1.1 Operating GX Configurator-CT

## (1) Initial settings (see Section 7.4)

Set the values on the screen as shown below.



| Setting item                               | Description                                                                                     | Setting                             |
|--------------------------------------------|-------------------------------------------------------------------------------------------------|-------------------------------------|
| Preset value setting                       | Set the preset value.                                                                           | 2500                                |
| Coincidence output point set No. 1         | Set the value for coincidence output point No. 1.                                               | 1000                                |
| Coincidence output point set No. 2         | This is not used.                                                                               | —                                   |
| Counter function selection setting         | Set the counter function to be used.<br>When a counter function is not used, sets any function. | Set according to the function used. |
| Sampling/periodic setting<br>[Unit: 10 ms] | Set "1000" when the sampling counter function is used.                                          | 1000                                |
|                                            | Set "500" when the periodic pulse counter function is used.                                     | 500                                 |
| Ring counter minimum value                 | Set only when the ring counter function is used.                                                | –5000                               |
| Ring counter maximum value                 | Set only when the ring counter function is used.                                                | 5000                                |

## (2) Auto refresh settings (see Section 7.5)

Set the values as shown in the screen below. (Use channel 1.)

| Setting item                          | Module side Buffer size | Module side Transfer word count | Transfer direction | PLC side Device |
|---------------------------------------|-------------------------|---------------------------------|--------------------|-----------------|
| CH1 Present value                     | 2                       | 2                               | ->                 | D0              |
| CH1 Latch count value                 | 2                       | 2                               | ->                 | D2              |
| CH1 Sampling count value              | 2                       | 2                               | ->                 | D4              |
| CH1 Periodic PLS count previous value | 2                       | 2                               | ->                 | D6              |
| CH1 Periodic PLS count present value  | 2                       | 2                               | ->                 | D8              |
| CH1 Sampling/periodic counter flag    | 1                       | 1                               | ->                 |                 |
| CH1 Overflow detection flag           | 1                       | 1                               | ->                 | D10             |
| CH2 Present value                     | 2                       | 2                               | ->                 |                 |
| CH2 Latch count value                 | 2                       | 2                               | ->                 |                 |

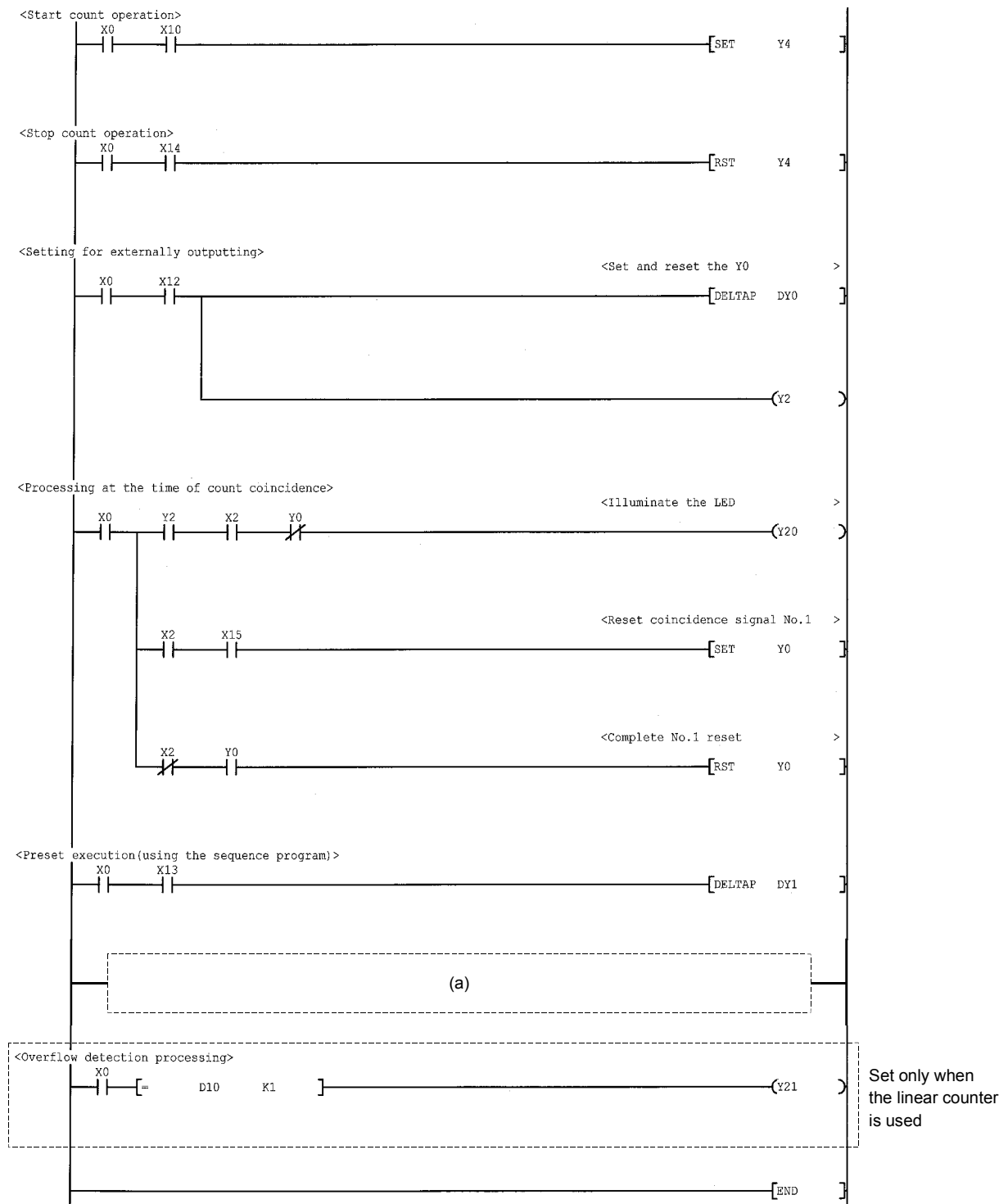
| Setting item                            | Description                                                                                                          | Setting |
|-----------------------------------------|----------------------------------------------------------------------------------------------------------------------|---------|
| CH1 Present value                       | Set the device for storing the present value.                                                                        | D0      |
| CH1 Latch count value                   | Set the device for storing the latch count value.                                                                    | D2      |
| CH1 Sampling count value                | Set the device for storing the sampling count value when the sampling counter function is used.                      | D4      |
| CH1 Periodic PLS counter previous value | Set the device for storing the previous periodic pulse count value when the periodic pulse counter function is used. | D6      |
| CH1 Periodic PLS counter present value  | Set the device for storing the present periodic pulse count value when the periodic pulse counter function is used.  | D8      |
| CH1 Sampling/periodic counter flag      | This is not used.                                                                                                    | —       |
| CH1 Overflow detection flag             | Set the device for storing the overflow detection result when the linear counter function is used.                   | D10     |

## (3) Writing the intelligent module parameters (see Section 7.3.3)

Write the intelligent module parameters to the programmable controller CPU.

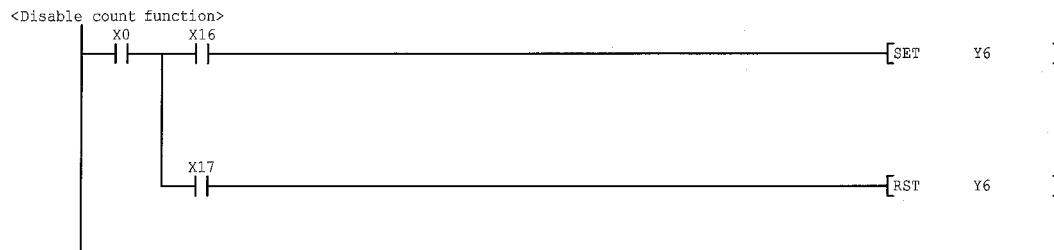
This operation is performed using the intelligent module parameter setting module selection screen.

## 8.1.2 Program example



(a) When using the functions listed below, the following programs are inserted.

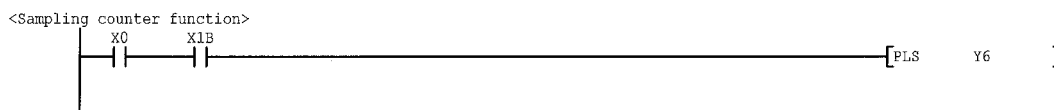
1) When the disable count function is used



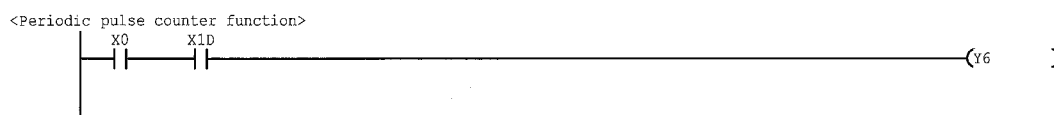
2) When the latch counter function is used



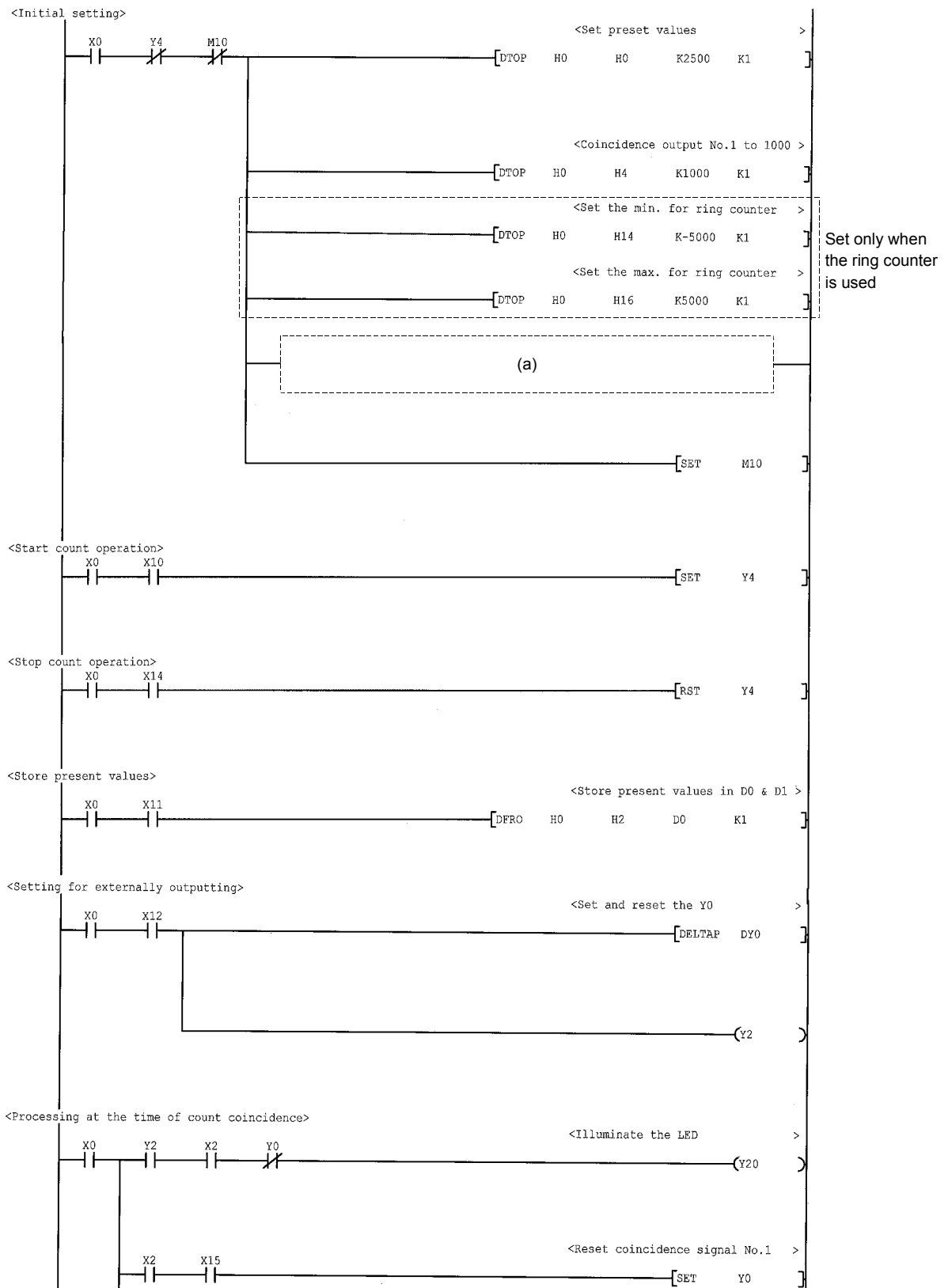
3) When the sampling counter function is used

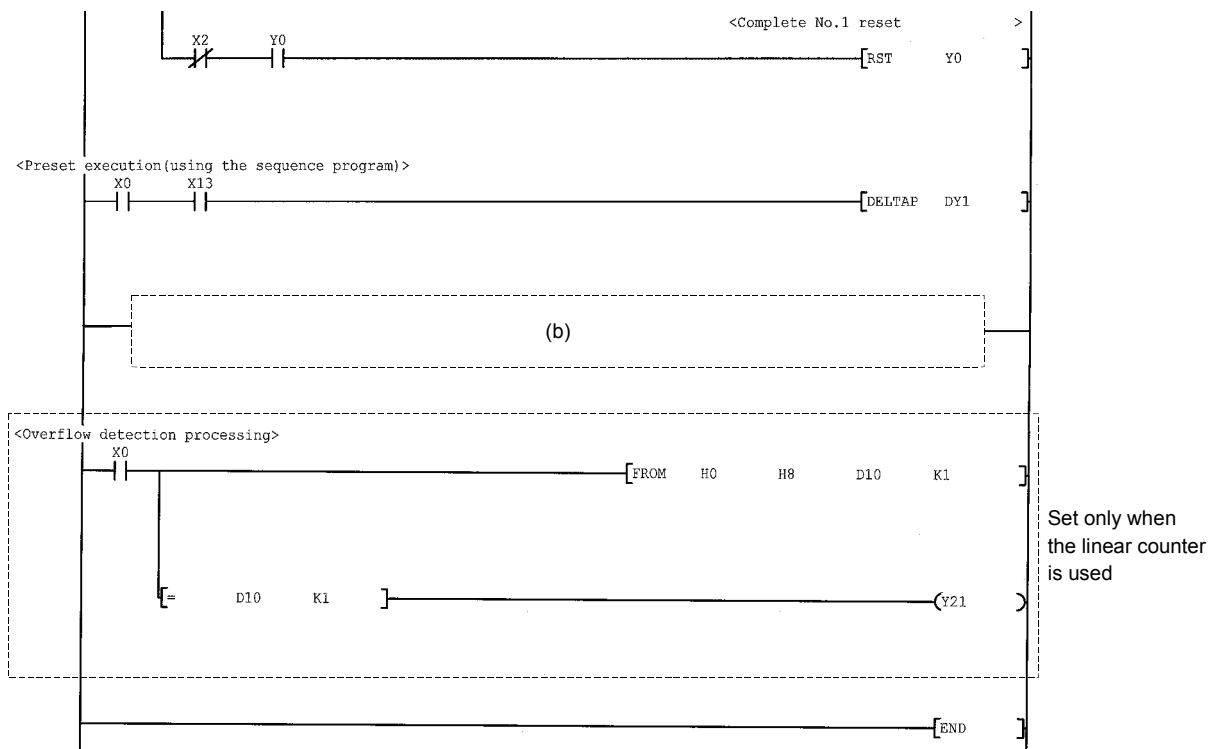


4) When the periodic pulse counter function is used



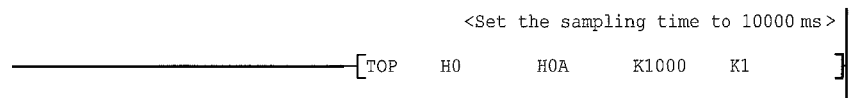
## 8.2 Program Example when GX Configurator-CT is not Used



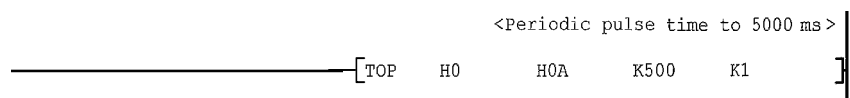


(a) When using the sampling counter function and the periodic pulse counter function, the following programs are inserted

1) When the sampling counter function is used

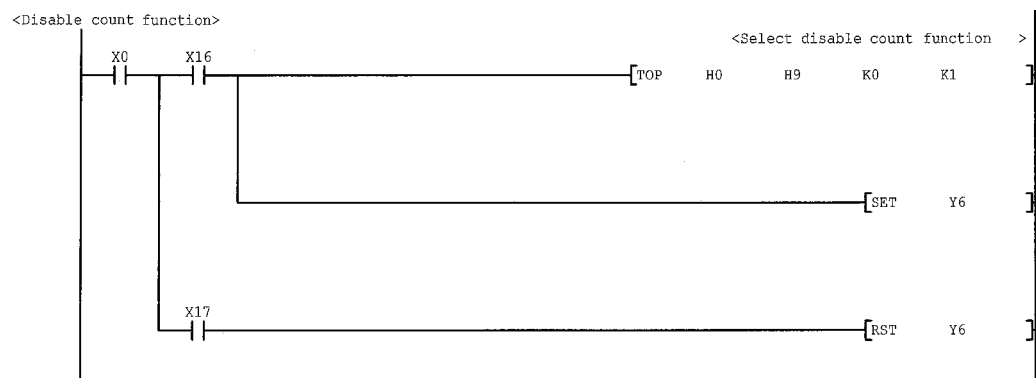


2) When the periodic pulse counter function is used

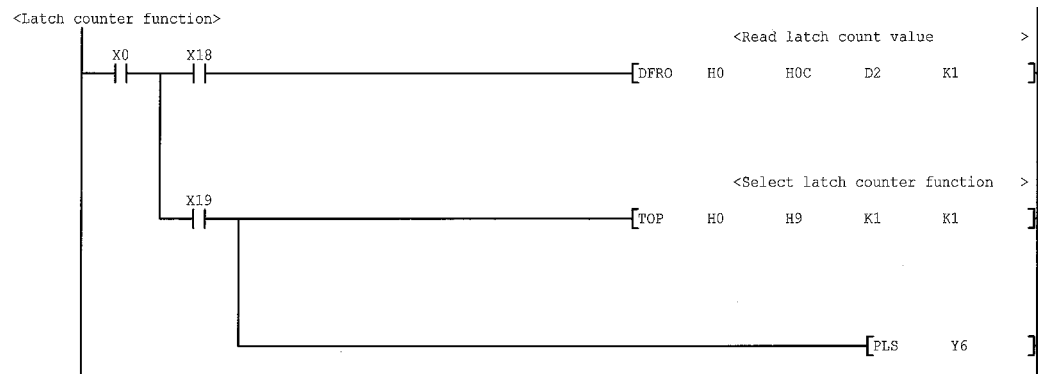


(b) When using the functions listed below, the following programs are inserted

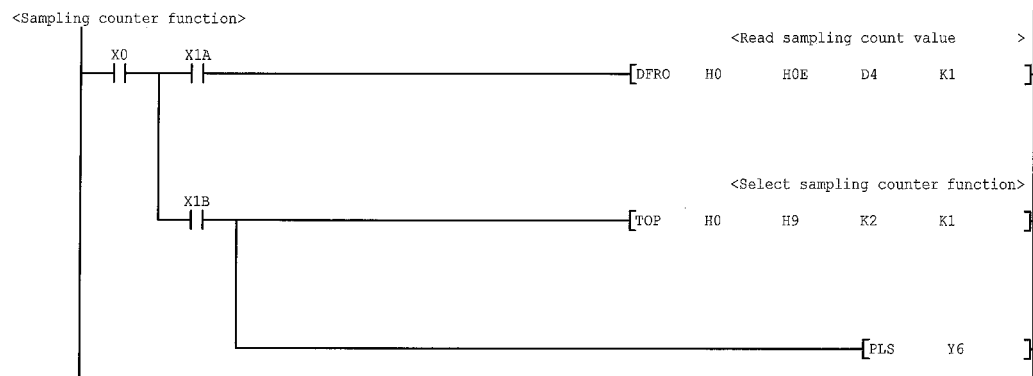
1) When the disable count function is used



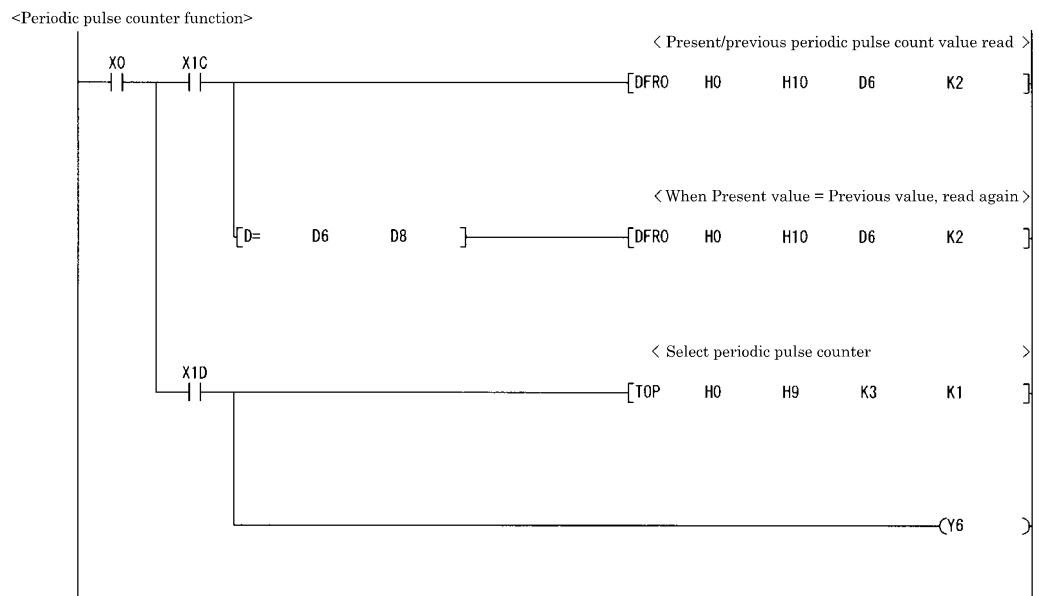
## 2) When the latch counter function is used



## 3) When the sampling counter function is used



## 4) When the periodic pulse counter function is used



### 8.3 Example of a Program Using the Coincidence Detection Interrupt Function

The following describes an example of a program that starts an interrupt program upon detection of coincidence with the channel 1 coincidence output point No. 1.

### (1) Interrupt point setting

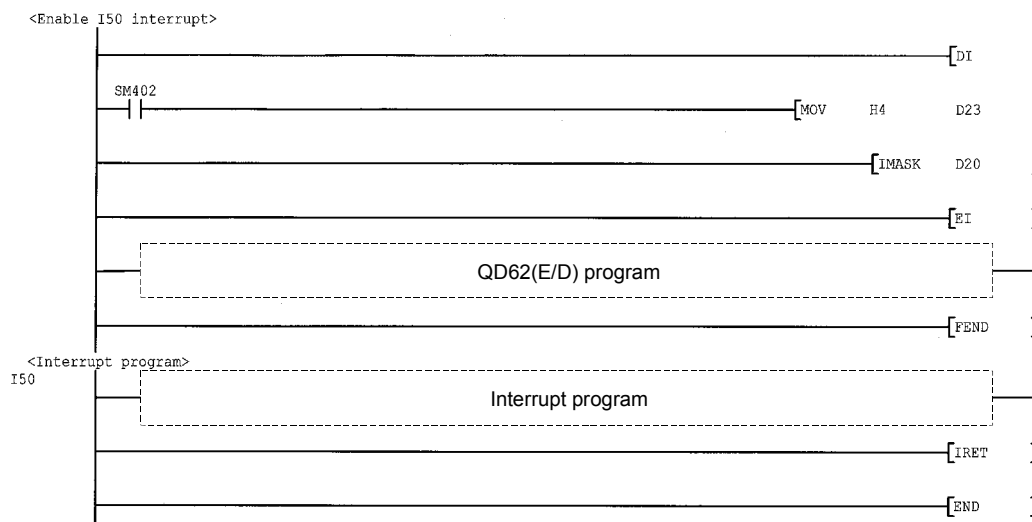
Set the interrupt pointer by selecting "PLC parameter" - " PLC system" – "Intelligent functional module setting" – "Interrupt point settings" in the project data list of GX Developer.

| Intelligent function module interrupt pointer setting |                                   |  |  |                      |              |
|-------------------------------------------------------|-----------------------------------|--|--|----------------------|--------------|
| PLC side                                              |                                   |  |  | Intelli. module side |              |
| Interrupt pointer<br>Start No.                        | Interrupt pointer<br>No.of module |  |  | Start I/O No.        | Start SI No. |
| 50                                                    | 1                                 |  |  | 0000                 | 0            |
|                                                       |                                   |  |  |                      |              |
|                                                       |                                   |  |  |                      |              |
|                                                       |                                   |  |  |                      |              |
|                                                       |                                   |  |  |                      |              |
|                                                       |                                   |  |  |                      |              |
|                                                       |                                   |  |  |                      |              |
|                                                       |                                   |  |  |                      |              |
|                                                       |                                   |  |  |                      |              |
|                                                       |                                   |  |  |                      |              |
|                                                       |                                   |  |  |                      |              |
|                                                       |                                   |  |  |                      |              |
|                                                       |                                   |  |  |                      |              |
|                                                       |                                   |  |  |                      |              |
|                                                       |                                   |  |  |                      |              |
|                                                       |                                   |  |  |                      |              |

Check
End
Cancel

## (2) Program example

Before using an interrupt pointer, an interrupt must be enabled using the IMASK instruction.



| POINT                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"><li>• When the above described program is executed, only I50 interrupt program is execution-enabled and other interrupt programs are execution-disabled. When executing interrupt programs other than I50, set the corresponding bit for interrupt program to be executed to 1 (enabled).</li><li>• For details of the IMASK instruction, refer to QCPU (Q Mode)/QnACPU Programming Manual (Common Instructions).</li></ul> |

## 9 TROUBLESHOOTING

The following explains the types of errors that may occur when the QD62(E/D) is used, and how to troubleshoot them.

### 9.1 Error Information

The error information detected by the QD62(E/D) is listed in the following chart.

| Description/cause                                                                                                                                                                                                                            | Error information display location                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Action                                                                                                                                      |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Overflow error</b><br>1) When the linear counter was used, an add pulse was further input from the current value 2147483647<br>2) When the linear counter was used, a subtract pulse was further input from the current value -2147483647 | 1) Module status display on the GX Developer system monitor screen<br>No status display: No overflow detected (no error)<br>Module error : Overflow being occurred<br>2) Overflow detection flag<br>The following value is stored in buffer memory address 8H (28H)<br>0: No overflow detected<br>1: Overflow being occurred<br>3) "Module error status bit" of the module information read with the UNIRD instruction<br>00: No overflow detected (no module error)<br>10: Overflow being occurred (Moderate error) | Preset to clear the overflow error.                                                                                                         |
| <b>Fuse broken detection</b><br>1) The fuse for the coincidence signal external output section has blown.                                                                                                                                    | 1) FUSE LED on the front of the module (red)<br>Off: No broken fuse detected<br>On: Broken fuse detected<br>2) Fuse broken detection flag (X0F)<br>Off: No broken fuse detected<br>On: Broken fuse detected<br>3) "Broken fuse occurrence indicating bit" of the module information read with the UNIRD instruction<br>Off: No broken fuse detected<br>On: Broken fuse detected                                                                                                                                      | The fuse must be replaced by a technician from the Service Center. Consult with our branch office or distributor with detailed description. |

#### POINT

If voltage is not being supplied to the external power supply input terminal, a broken fuse will not be detected.

## 9.2 When the QD62(E/D) Does Not Start Counting

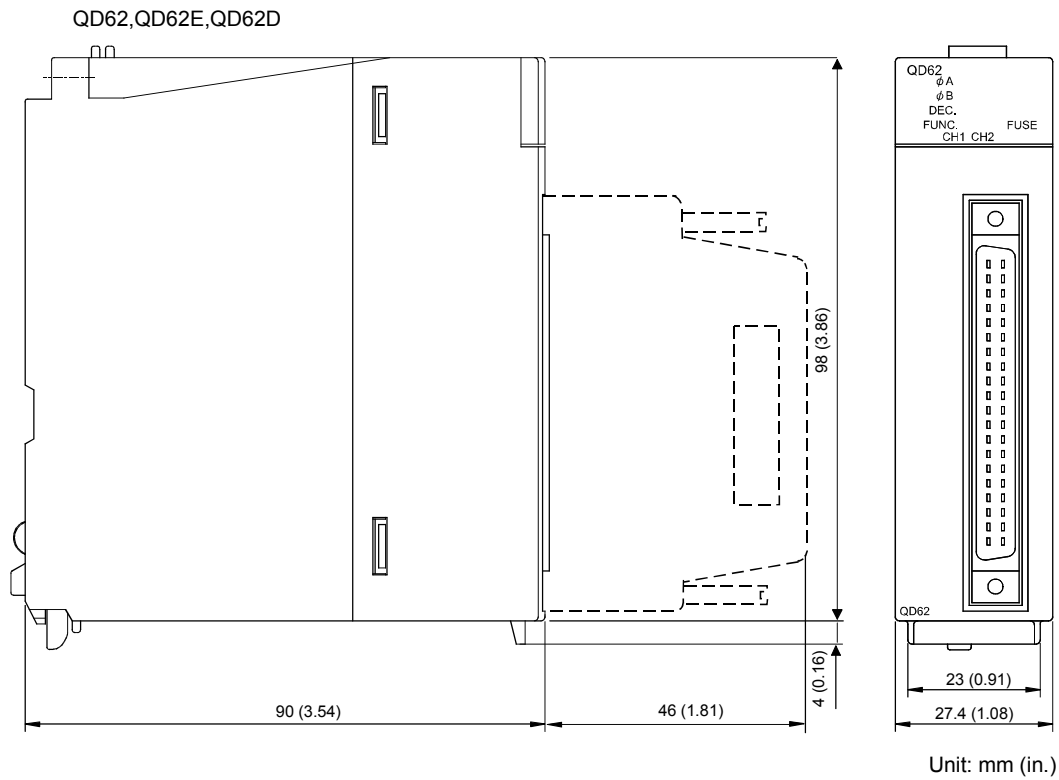
| Check item                                                                                                                                                     | Action                                                                                                                                                                                                                                     |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Doesn't the programmable controller CPU indicate an error?                                                                                                     | If the LED on the programmable controller CPU indicates an error, correct the error with reference to troubleshooting in the programmable controller CPU's manual for normal operation.                                                    |
| Do the LEDs of $\phi A$ and $\phi B$ turn ON by directly applying voltage using such as voltage stabilizer to pulse input terminals of $\phi A$ and $\phi B$ ? | If they turn ON, check the external wiring and encoder side and correct the error.<br>If they remain OFF, it is a hardware failure. Please consult your local Mitsubishi representative, explaining a detailed description of the problem. |
| Is the external wiring of $\phi A$ and $\phi B$ normal?                                                                                                        | Check the external wiring and correct the error.                                                                                                                                                                                           |
| Is the count enable command {Y04 (Y0C)} ON?                                                                                                                    | Turn the count enable command {Y04 (Y0C)} ON with the sequence program.                                                                                                                                                                    |
| Are the pulse input method and pulse input mode set with the intelligent function module switch setting the same?                                              | Match the pulse input method with the pulse input mode made on the intelligent function module switch setting.                                                                                                                             |
| Is the counter function selection start instruction {Y06 (Y0E)} ON or is voltage being applied to the function start input terminals?                          | If the disable count function has been set with the counter selection function, turn OFF the counter function selection start instruction {Y06 (Y0E)} or the function start input terminal.                                                |
| Is an overflow error occurring?                                                                                                                                | Preset to clear the overflow error.                                                                                                                                                                                                        |

## 9.3 When the QD62(E/D) Does Not Normally Count

| Check item                                                                                                                         | Action                                                                                                                                                                               |
|------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Is the external wiring of $\phi A$ and $\phi B$ normal?                                                                            | Check the external wiring and correct the error.                                                                                                                                     |
|                                                                                                                                    | The module may miscount when ABCOM terminal is connected to a pulse signal.<br>Connect the ABCOM terminal with external power (5V/12V/24V) or GND terminal (refer to Section 4.4.2). |
| Is the maximum speed of input pulse within the range of the counting speed made on the intelligent function module switch setting? | Correct the counting speed setting in the intelligent function module switch setting to meet the maximum speed of the input pulse.                                                   |
| Does the input pulse waveform meet the performance specifications?                                                                 | Check the pulse waveform with synchronoscope. When the input pulse does not meet the performance specifications, input the pulse which meets the performance specifications.         |
| Are the count value data treated in 32-bit binary in the sequence program?                                                         | Correct the sequence program so that the count value data can be treated in 32-bit binary.                                                                                           |
| Are the shielded twisted pair cables used for pulse input wiring?                                                                  | Use the shielded twisted pair cables for pulse input wiring.                                                                                                                         |
| Doesn't any noise come from the ground part of the QD62(E/D)?                                                                      | Separate the ground cable of the QD62(E/D) from the ground part. When the QD62(E/D) case touches to the ground part, separate it.                                                    |
| Has the measures against noise been taken to the adjacent devices and inside the control panel?                                    | Take noise reduction measures (e.g. attach a CR surge suppressor to the magnet switch).                                                                                              |
| Is the distance between the high voltage equipment and pulse input line kept enough?                                               | Bundle the pulse input lines and put them in a single tube, and keep a distance of 150 mm (5.91 inch) or more with the power line even inside the control panel.                     |
| Has the same count been input for both CH1 and CH2 and are the count values the same?                                              | When the count values are different, this is a hardware error.<br>Contact our branch office or distributor for consultation and give details of the problem.                         |

APPENDIX

Appendix 1 External Dimension Diagram



A value in parentheses shows the reference measurement when the A6CON1 is installed.

## Appendix 2 Difference Between A1SD62, A1SD62E and A1SD62D (S1)

The following table lists the difference between A1SD62, A1SD62E and A1SD62D (S1).

| Model name                                                       |                                | QD62                                                                                                                 | D62E | D62D     | A1SD62                                                                                                                                                               | A1SD62E | A1SD62D (S1) |
|------------------------------------------------------------------|--------------------------------|----------------------------------------------------------------------------------------------------------------------|------|----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|--------------|
| Function                                                         |                                |                                                                                                                      |      |          |                                                                                                                                                                      |         |              |
| Counting                                                         |                                | 32-bit signed binary counter<br>(-2147483648 to 2147483647)                                                          |      |          | 32-bit unsigned binary counter<br>(0 to 16777215)                                                                                                                    |         |              |
| Number of I/O occupied points                                    |                                | 16 points                                                                                                            |      |          | 32 points                                                                                                                                                            |         |              |
| Maximum counting speed                                           |                                | 200 kPPS                                                                                                             |      | 500 kPPS | 100 kPPS                                                                                                                                                             |         | 200 kPPS     |
| CW/CCW pulse input                                               |                                | Function available                                                                                                   |      |          | No function                                                                                                                                                          |         |              |
| Counter                                                          | Linear counter function        | Function available                                                                                                   |      |          | No function                                                                                                                                                          |         |              |
|                                                                  | Ring counter function          | Function available<br>(Preset and coincidence output function can be used independently of the ring counter setting) |      |          | Function available<br>(The ring counter operation only between the preset value and the coincidence output point. Setting values cannot be changed during operation) |         |              |
|                                                                  | Coincidence detection function | Function available<br>(program interrupt allowed)                                                                    |      |          | Function available<br>(coincidence detection only)                                                                                                                   |         |              |
|                                                                  | Overflow detection function    | Function available                                                                                                   |      |          | No function                                                                                                                                                          |         |              |
| Maximum and minimum value settings for the ring counter function |                                | Can be set                                                                                                           |      |          | Cannot be set                                                                                                                                                        |         |              |
| Utility package support                                          |                                | Function available                                                                                                   |      |          | No function                                                                                                                                                          |         |              |
| Fuse broken detection                                            |                                | Function available<br>(Only broken fuses are detected, LED display)                                                  |      |          | Function available<br>(Both broken fuses and external power off are detected)                                                                                        |         |              |

## POINT

Programs that were used in earlier products such as A1SD62 (E/D/D-S1) cannot be used because the I/O signals and the buffer memory configuration of these products differ from those of QD62 (E/D). The conventional dedicated instructions cannot be used.

## INDEX

## [A]

|                              |      |
|------------------------------|------|
| A6CON1 .....                 | 4-4  |
| A6CON2 .....                 | 4-4  |
| A6CON3 .....                 | 4-4  |
| A6CON4 .....                 | 4-4  |
| Applicable CPU modules ..... | 2-1  |
| Auto refresh .....           | 7-14 |

## [B]

|                                 |     |
|---------------------------------|-----|
| Buffer memory assignments ..... | 3-8 |
|---------------------------------|-----|

## [C]

|                                                    |          |
|----------------------------------------------------|----------|
| Clamping torque .....                              | 4-1      |
| Coincidence detection interrupt function .....     | 5-8      |
| Coincidence output function .....                  | 3-4, 5-7 |
| Common operations .....                            | 7-6      |
| Connector .....                                    | 4-4      |
| Connector/terminal block converter<br>module ..... | 4-12     |
| Count error .....                                  | 6-3      |
| Count method .....                                 | 5-3      |
| Count range .....                                  | 5-5      |
| Counter function .....                             | 6-1      |
| CW/CCW pulse input .....                           | 5-2      |

## [D]

|                              |          |
|------------------------------|----------|
| Difference .....             | App-2    |
| Disable count function ..... | 3-4, 6-4 |

## [E]

|                                      |       |
|--------------------------------------|-------|
| EMC directive .....                  | A-9   |
| Encoders that can be connected ..... | 3-14  |
| Encoders .....                       | 3-14  |
| Error information .....              | 9-1   |
| Error .....                          | 6-3   |
| External dimension diagram .....     | App-1 |
| External wiring connector .....      | 4-4   |

## [F]

|                                   |          |
|-----------------------------------|----------|
| Features .....                    | 1-2      |
| Function                          |          |
| Coincidence output function ..... | 3-4, 5-7 |
| Counter function .....            | 6-1      |
| Disable count function .....      | 3-4, 6-4 |

|                                       |           |
|---------------------------------------|-----------|
| Latch counter function .....          | 3-4, 6-5  |
| Linear counter function .....         | 3-4       |
| List .....                            | 3-4, 7-1  |
| Periodic pulse counter function ..... | 3-4, 6-7  |
| Preset function .....                 | 3-4, 5-10 |
| Sampling counter function .....       | 3-4, 6-6  |
| Ring counter function .....           | 3-4       |

## [H]

|                            |          |
|----------------------------|----------|
| Handling precautions ..... | 4-1, 7-2 |
|----------------------------|----------|

## [I]

|                                       |      |
|---------------------------------------|------|
| Initial settings .....                | 7-12 |
| Installing and uninstalling .....     | 7-2  |
| Interface with external devices ..... | 3-11 |
| Interface .....                       | 3-11 |
| Interruption .....                    | 5-8  |

## [L]

|                               |          |
|-------------------------------|----------|
| Latch counter function .....  | 3-4, 6-5 |
| LED .....                     | 4-3      |
| Linear counter function ..... | 3-4, 5-4 |
| List of I/O signals .....     | 3-5      |

## [M]

|                     |      |
|---------------------|------|
| Menu bar .....      | 7-11 |
| Monitor/test .....  | 7-16 |
| Mounting slot ..... | 2-1  |

## [N]

|                         |     |
|-------------------------|-----|
| Noise .....             | 4-5 |
| Number of modules ..... | 2-1 |

## [O]

|                             |     |
|-----------------------------|-----|
| Operating environment ..... | 7-4 |
| Operation overview .....    | 7-8 |
| Overflow .....              | 5-4 |
| Overview .....              | 1-1 |

## [P]

|                                        |          |
|----------------------------------------|----------|
| Part identification nomenclature ..... | 4-3      |
| Performance specifications .....       | 3-1      |
| Periodic pulse counter function .....  | 3-4, 6-7 |

|                                              |               |
|----------------------------------------------|---------------|
| Phase 1 pulse input.....                     | 5-2           |
| Phase 2 pulse input.....                     | 5-2           |
| Precautions.....                             | 4-1, 4-5, 7-2 |
| Preset function.....                         | 3-4, 5-10     |
| Procedure before starting the operation..... | 4-2           |
| Procedure .....                              | 4-2           |
| Program conditions .....                     | 8-1           |
| Programming .....                            | 8-1           |
| Pulse input methods.....                     | 5-1           |

## [R]

|                                  |          |
|----------------------------------|----------|
| Reading                          |          |
| Count value.....                 | 6-2      |
| Present value.....               | 5-3      |
| Reading the present values ..... | 5-3      |
| Ring counter function .....      | 3-4, 5-5 |

## [S]

|                                                          |          |
|----------------------------------------------------------|----------|
| Sampling counter function .....                          | 3-4, 6-6 |
| Setup and procedure before starting the operation .....  | 4-1      |
| SI.....                                                  | 5-8      |
| Specifications .....                                     | 3-1      |
| Starting the utility.....                                | 7-10     |
| Startup .....                                            | 7-12     |
| Supported software packages .....                        | 2-3      |
| Switch setting for the intelligent function module ..... | 4-14     |
| Switch .....                                             | 4-14     |
| System configurations.....                               | 2-1      |

## [T]

|                                      |     |
|--------------------------------------|-----|
| Text files .....                     | 7-7 |
| The details of the I/O signals ..... | 3-6 |
| Troubleshooting.....                 | 9-1 |

## [U]

|                                    |     |
|------------------------------------|-----|
| Utility package function list..... | 7-1 |
|------------------------------------|-----|

## [W]

|                         |     |
|-------------------------|-----|
| Wiring precautions..... | 4-5 |
| Wiring.....             | 4-5 |

# WARRANTY

Please confirm the following product warranty details before using this product.

## 1. Gratis Warranty Term and Gratis Warranty Range

If any faults or defects (hereinafter "Failure") found to be the responsibility of Mitsubishi occurs during use of the product within the gratis warranty term, the product shall be repaired at no cost via the sales representative or Mitsubishi Service Company.

However, if repairs are required onsite at domestic or overseas location, expenses to send an engineer will be solely at the customer's discretion. Mitsubishi shall not be held responsible for any re-commissioning, maintenance, or testing on-site that involves replacement of the failed module.

### [Gratis Warranty Term]

The gratis warranty term of the product shall be for one year after the date of purchase or delivery to a designated place.

Note that after manufacture and shipment from Mitsubishi, the maximum distribution period shall be six (6) months, and the longest gratis warranty term after manufacturing shall be eighteen (18) months. The gratis warranty term of repair parts shall not exceed the gratis warranty term before repairs.

### [Gratis Warranty Range]

- (1) The range shall be limited to normal use within the usage state, usage methods and usage environment, etc., which follow the conditions and precautions, etc., given in the instruction manual, user's manual and caution labels on the product.
- (2) Even within the gratis warranty term, repairs shall be charged for in the following cases.
  1. Failure occurring from inappropriate storage or handling, carelessness or negligence by the user. Failure caused by the user's hardware or software design.
  2. Failure caused by unapproved modifications, etc., to the product by the user.
  3. When the Mitsubishi product is assembled into a user's device, Failure that could have been avoided if functions or structures, judged as necessary in the legal safety measures the user's device is subject to or as necessary by industry standards, had been provided.
  4. Failure that could have been avoided if consumable parts (battery, backlight, fuse, etc.) designated in the instruction manual had been correctly serviced or replaced.
  5. Failure caused by external irresistible forces such as fires or abnormal voltages, and Failure caused by force majeure such as earthquakes, lightning, wind and water damage.
  6. Failure caused by reasons unpredictable by scientific technology standards at time of shipment from Mitsubishi.
  7. Any other failure found not to be the responsibility of Mitsubishi or that admitted not to be so by the user.

## 2. Onerous repair term after discontinuation of production

- (1) Mitsubishi shall accept onerous product repairs for seven (7) years after production of the product is discontinued. Discontinuation of production shall be notified with Mitsubishi Technical Bulletins, etc.
- (2) Product supply (including repair parts) is not available after production is discontinued.

## 3. Overseas service

Overseas, repairs shall be accepted by Mitsubishi's local overseas FA Center. Note that the repair conditions at each FA Center may differ.

## 4. Exclusion of loss in opportunity and secondary loss from warranty liability

Regardless of the gratis warranty term, Mitsubishi shall not be liable for compensation of damages caused by any cause found not to be the responsibility of Mitsubishi, loss in opportunity, lost profits incurred to the user by Failures of Mitsubishi products, special damages and secondary damages whether foreseeable or not, compensation for accidents, and compensation for damages to products other than Mitsubishi products, replacement by the user, maintenance of on-site equipment, start-up test run and other tasks.

## 5. Changes in product specifications

The specifications given in the catalogs, manuals or technical documents are subject to change without prior notice.

## 6. Product application

- (1) In using the Mitsubishi MELSEC programmable controller, the usage conditions shall be that the application will not lead to a major accident even if any problem or fault should occur in the programmable controller device, and that backup and fail-safe functions are systematically provided outside of the device for any problem or fault.
- (2) The Mitsubishi programmable controller has been designed and manufactured for applications in general industries, etc. Thus, applications in which the public could be affected such as in nuclear power plants and other power plants operated by respective power companies, and applications in which a special quality assurance system is required, such as for Railway companies or Public service purposes shall be excluded from the programmable controller applications.

In addition, applications in which human life or property that could be greatly affected, such as in aircraft, medical applications, incineration and fuel devices, manned transportation, equipment for recreation and amusement, and safety devices, shall also be excluded from the programmable controller range of applications.

However, in certain cases, some applications may be possible, providing the user consults their local Mitsubishi representative outlining the special requirements of the project, and providing that all parties concerned agree to the special circumstances, solely at the users discretion.

Microsoft, Windows, Windows NT, and Windows Vista are registered trademarks of Microsoft Corporation in the United States and other countries.

Adobe, Acrobat is a registered trademark of Adobe systems Incorporated.

Pentium, Celeron is a registered trademark of Intel Corporation in the United States and other countries.

Ethernet is a registered trademark of Xerox.co.ltd in the United States.

Other company and product names herein are either trademarks or registered trademarks of their respective owners.

SPREAD

Copyright (c) 1996 FarPoint Technologies, Inc.



# High-Speed Counter Module

## User's Manual

|                          |                 |
|--------------------------|-----------------|
| MODEL                    | QD62(E/D)-U-S-E |
| MODEL<br>CODE            | 13JL95          |
| SH(NA)-080036-L(0801)MEE |                 |



HEAD OFFICE : TOKYO BUILDING, 2-7-3 MARUNOUCHI, CHIYODA-KU, TOKYO 100-8310, JAPAN  
NAGOYA WORKS : 1-14, YADA-MINAMI 5-CHOME, HIGASHI-KU, NAGOYA, JAPAN

When exported from Japan, this manual does not require application to the  
Ministry of Economy, Trade and Industry for service transaction permission.

Specifications subject to change without notice.